



Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402

CNL-19-009

September 18, 2019

10 CFR 50.90

ATTN: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Browns Ferry Nuclear Plant, Units 1, 2, and 3  
Renewed Facility Operating License Nos. DPR-33, DPR-52, and DPR-68  
NRC Docket Nos. 50-259, 50-260, and 50-296

**Subject: Browns Ferry Nuclear Plant, Units 1, 2 and 3, License Amendment Request to Revise Emergency Plan Staff Augmentation Times (TS-515)**

In accordance with the provisions of 10 CFR 50.90, "Application for Amendment of License, Construction Permit, or Early Site Permit," Tennessee Valley Authority (TVA) is submitting a request for an amendment to Renewed Facility Operating License Nos. DPR-33, DPR-52, and DPR-68 for Browns Ferry Nuclear Plant (BFN) Units 1, 2, and 3, respectively. TVA is proposing changes to the BFN Emergency Plan that extend staff augmentation times for Emergency Response Organization (ERO) functions. These changes are being pursued because there have been a number of technological, procedural, staffing, and equipment enhancements since the Radiological Emergency Plan was last approved by the NRC.

The Enclosure provides a description of the proposed changes, a technical evaluation of the proposed changes, a regulatory evaluation, and a discussion of environmental considerations. Attachment 1 to the Enclosure provides a markup version of the BFN Emergency Plan showing the proposed changes to the affected pages. Attachment 2 to the Enclosure provides the retyped BFN Emergency Plan, incorporating the proposed changes to the affected pages. Attachment 3 to the Enclosure provides a comparison between NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, the 1988 NRC approved BFN Emergency Plan (Revision 0), the current BFN Emergency Plan, and the proposed changes to the BFN Emergency Plan. Attachment 4 to the Enclosure provides Letters of Concurrence from the Alabama Emergency Management Agency and the Alabama Department of Public Health.

TVA has determined that there are no significant hazards considerations associated with the proposed changes and that the changes qualify for a categorical exclusion from environmental review pursuant to the provisions of 10 CFR 51.22(c)(9).

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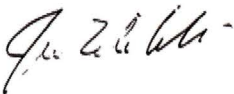
Additionally, in accordance with 10 CFR 50.91(b)(1), TVA is sending a copy of this letter and the enclosure to the Alabama State Department of Public Health.

TVA requests approval of this proposed license amendment within one year from the date of this letter with implementation within 180 days of approval.

There are no new regulatory commitments associated with this submittal. If you have any questions about this proposed change, please contact Kimberly D. Hulvey at 423-751-3275.

I declare under penalty of perjury that the foregoing is true and correct. Executed on the 18th day of September 2019.

Respectfully,



James T. Polickoski  
Director, Nuclear Regulatory Affairs

Enclosure: Evaluation of Proposed Changes

cc (Enclosure):

NRC Regional Administrator - Region II  
NRC Senior Resident Inspector - Browns Ferry Nuclear Plant  
NRC Project Manager - Browns Ferry Nuclear Plant  
State Health Officer, Alabama State Department of Public Health

**ENCLOSURE 1**  
**BROWNS FERRY NUCLEAR PLANT**  
**UNIT 1, UNIT 2, and UNIT 3**  
**Evaluation of Proposed Changes**

License Amendment Request to Revise Emergency Plan  
Staff Augmentation Times (TS-515)

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- 1. Proposed Emergency Plan Sections (Mark-up)
- 2. Proposed Emergency Plan Sections (Retyped)
- 3. NUREG-0654 Table B-1 Comparative Chart
- 4. Offsite Response Organization Concurrence Letters

## 1.0 SUMMARY DESCRIPTION

Tennessee Valley Authority (TVA) proposes revisions to the Browns Ferry Nuclear Plant (BFN), Units 1, 2 and 3, Emergency Plan. TVA evaluated the effects associated with the proposed changes by completing a staffing analysis of on-shift responsibilities. Additionally, a functional analysis of the augmented Emergency Response Organization (ERO) positions based on extended response times and completion of Major Tasks as outlined in NUREG-0654/FEMA-REP-1, Revision 1, was completed. The analyses supported this request to make the following changes to the ERO while maintaining the site's ability to protect public health and safety.

- Eliminate 30-minute augmented response positions
- Extend the requirement for dispatch of sampling teams and augmentation of ERO positions to 60 and 90 minutes as applicable
- Reduce the number of Radiation Protection (RP) immediate response positions from 12 to 8
- Transition on-shift dose assessment function from RP to Chemistry
- Remove maintenance personnel from on-shift
- Extend the 60-minute augmented response by the Radwaste Operator (RWO) to 90 minutes
- Eliminate support positions of Site Vice President and Emergency Preparedness Manager and Fire Protection Briefer
- Remove support positions for Technical Support Center (TSC) and Operations Support Center (OSC) clerical staff, Document Control personnel, TSC Communicator and Status Board Writers from Appendix A Emergency Plan Figures
- Application of the term 'activated' to facility response

Revised figures are included in the proposed BFN Emergency Plan that delineates positions associated with facility activation. This change allows for the transfer of State/local notification, dose assessment, and Protective Action Recommendations functions from the control room to the CECC in advance of 60 minutes when Minimum Activation Staffing Positions (MASP) are met as currently defined in the Emergency Plan and clarifies facility organizational alignment.

The changes in staff augmentation response times, reduction in the number of immediate RP responders, removal of maintenance personnel from on-shift, and extension of the 60-minute augmented RWO response time are considered a reduction in Emergency Plan effectiveness as defined in 10 CFR 50.54(q)(1)(iv). In accordance with 10 CFR 50.54(q)(4), changes to a licensee's emergency plan that reduce the effectiveness of the plan may not be implemented without prior Nuclear Regulatory Commission (NRC) approval and are submitted as a license amendment request (LAR) in accordance with 10 CFR 50.90.

## 2.0 DETAILED DESCRIPTION

### 2.1 Proposed Changes

Brief descriptions of the associated Emergency Plan proposed changes are provided below. The justification for each change is discussed in Section 3.2. The specific wording changes are provided in Attachments 1 and 2 to this enclosure as marked-up and retyped copies, respectively, of the Emergency Plan pages, respectively.

- a. Radiological Emergency Plan (REP) Generic, Section 3.2.2, "Site Vice President," added notation that the position applies to Watts Bar only in accordance with the proposed change.
- b. REP Generic, Section 4.1.3, "Alert," added statement to include the dispatch of monitoring teams at this classification level for BFN in accordance with the proposed change.
- c. REP Generic, Section 5.2.2, "Alert," revised wording to reflect dispatch of monitoring teams at this classification level in accordance with the proposed change.
- d. REP Generic, Section 9.2.2.A, "Sampling Team," revised section to reflect dispatch of sampling team vehicles at an Alert or higher classification for BFN.
- e. REP Generic, Section 9.2.2.E, "Sampling Team," revised dispatch from 30 minutes at a Site Area Emergency or higher declaration to 60 minutes from an Alert or higher declaration for the first team and 90 minutes for the second team in accordance with the proposed changes for BFN.
- f. Appendix A, Section 3.0, "Site Emergency Organization," revised to reflect process for transfer of command and control functions from the Control Room.
- g. Appendix A, Section 3.1, "Site Vice President," deleted section to reflect emergency response organizational change.
- h. Appendix A, Section 3.2, "Site Emergency Director," revised to reflect removal of the Site Vice President position as well as initial staffing of the CECC in accordance with the proposed change.
- i. Appendix A, Section 3.3, "Operations Manager," revised to reflect transition of the Federal Notification function upon activation of the TSC in accordance with the proposed change.
- j. Appendix A, Section 3.6, "TSC Clerks," removed as a support function in accordance with the proposed change.

- k. Appendix A, Section 3.7, "TSC Communicator," removed as a support function in accordance with the proposed change.
- l. Appendix A, Section 3.17, "Operations Communicator," revised to include responsibility for the Federal Notification function upon activation of the TSC in accordance with the proposed change.
- m. Appendix A, Section 3.18, "Emergency Preparedness Manager," deleted section to align with proposed changes to ERO.
- n. Appendix A, Figure A-1, "Site Emergency Organization," revised to split TSC and OSC organizational structures into separate pages, added indications for minimum staffing positions in each facility.
- o. Appendix A, Figure A-2, "Minimum Shift Response Personnel," revised to include table utilizing format noted in NUREG-0654, Rev 1, Table B-1 to indicate on-shift, 60-minute and 90-minute response positions. Figure A-2 title was renamed, "Minimum Emergency Response Staffing"
- p. Appendix A, Section 4.1, "Technical Support Center (TSC)," added paragraph describing activation time for the TSC.
- q. Appendix A, Section 4.2, "Operations Support Center (OSC)," added paragraph describing activation time for OSC.
- r. Appendix A, Figure A-3, "Technical Support Center," revised to add the word 'Sample' to title to identify acceptability of other facility configurations as needed and removed assignments list to align with proposed ERO changes
- s. Appendix A, Figure A-4, "Operations Support Center," revised to add the word 'Sample' to title to identify acceptability of other facility configurations as needed and removed assignments list to align with proposed ERO changes.

## 2.2 Reason for the Proposed Changes

The proposed change to extend augmented response timeframes and reduce the number of immediate RP responders is needed to address limitations on the number of personnel available to respond to the site in 30 and 60 minutes. Some personnel live far enough away from the site that they may be precluded from being assigned as immediate responders in the augmented ERO. Extending augmentation times increases the population of eligible personnel available to fill response positions and adds valuable expertise. The proposed change will not be applied as permission to delay response to an event.

The current BFN Emergency Plan requires response by 6 RP individuals at 30 minutes and an additional 6 individuals at 60 minutes. The number of RP augmented responders is aligned with NUREG-0654, Rev 1, Table B-1 values. The proposed changes reduce the number of augmented RP positions and extends the response times for these positions in order to allow for increased flexibility in long term staffing for RP activities. The proposed changes also

provide access to a larger pool of RP staff members that would be available for event response. Augmentation of 4 RP Technicians at 60 minutes and an additional 4 RP Technicians at 90 minutes is supported by improvement in the use of technology used for in-plant monitoring capability and access control/dosimetry as discussed in Section 3.0 of this Enclosure. One of the tasks assigned to augmented RP positions is the performance of environmental monitoring. The current Plan requires the dispatch of one survey team at 30 minutes and a second team at 60 minutes following the declaration of a Site Area Emergency or higher classification. The proposed change would extend the response time for the dispatch of the first survey team to 60 minutes and the second team to 90 minutes following an Alert or higher classification rather than at the current Site Area Emergency or General Emergency classifications. The proposed change uses qualified (non-RP) personnel as survey team drivers, thus reducing the number of RP Technicians needed to perform the environmental monitoring function, which allows better allocation of resources. Additional tasks assigned to augmented RP resources are the performance of activities associated with radiological assessment and protective action functions. Radiological assessment includes in-plant and onsite (out-of-plant) survey capability. NUREG-0654, Rev 1, Table B-1 identifies 2 HP Technicians augmented at 30 minutes and 2 additional HP Technicians augmented at 60 minutes for performance of these tasks. A review of in-plant and onsite (out-of-plant) monitoring functions shows that the use of in-plant and effluent monitors effectively supports event classification and onsite radiological assessment activities such that performance of tasks associated with these functions task at 60 minutes rather than 30 minutes does not adversely impact site response. Additionally, the use of plant monitoring capability allows for determination of release status without requiring assignment of a dedicated RP technician to perform onsite (out-of-plant) surveys. Rather, such surveys can be completed periodically, as assigned by the OSC, based on event conditions. Use of this monitoring capability reduces the burden associated with completion of surveys and therefore, reduces the need for dedicated resources for performance of this work. This, combined with the improved capabilities associated with in-plant monitoring and availability of remote monitoring capabilities allow for assignment of augmented RP personnel for the performance of both onsite (out-of-plant) and in-plant surveys as needed for a given emergency condition, thus reducing the total number of RP Technicians needed for performance of these activities.

The on-shift dose assessment function is transitioned from RP personnel to the on-shift Chemistry Technician. In the On-Shift Staffing Assessment (OSA), TVA determined that chemistry sampling activities were not required for the first 90 minutes after the event. Performance of dose assessment by the chemistry technician during this time allows the on-shift RP personnel to focus on radiological assessment and protective action functions.

In the OSA, for the analyzed events, there were no actions requiring response by maintenance personnel for the first 90 minutes after event classification. Initial event response actions associated with troubleshooting are normally completed by on-shift operations personnel. The diverse and redundant nature of the Emergency Core Cooling System (ECCS) obviates the need for maintenance activities as part of the initial response to an event. As a result, the proposed change removes maintenance positions from on-shift and makes these positions available for augmentation at 60 and 90 minutes to address equipment repair activities. Details associated with ECCS are addressed in Section 3.2.5 of this Enclosure. The proposed change maintains the requirement for augmentation of an Electrical craft position and a Mechanical Maintenance craft position at 60 minutes, and extends augmentation of an Instrument and Controls (I&C) Maintenance craft position to 90 minutes.

The Radwaste Operator (RWO) is described in Figure A-1 of the BFN Emergency Plan as augmenting the on-shift Operations Staff. The OSA did not identify actions requiring response by the RWO for the first 90 minutes after event classification. As a result, the proposed change would extend the response time for the RWO from 60 minutes to 90 minutes.

The current BFN Emergency Plan identified 30-minute response positions in the OSC and 60-minute response positions in the TSC. The proposed change eliminates 30-minute response requirements, maintains 60-minute response for MASP and extends the response times for remaining staff to 90 minutes. This change allows for transfer of command and control functions from the control room to augmented response facilities within the current 60-minute timeframe while allowing for extended response times for ERO personnel not performing activities directly related to relief of control room staff.

The TSC positions of Site Vice President and Emergency Preparedness Manager and the OSC position of Fire Protection Briefer were originally included in the BFN Emergency Plan to identify additional resources available to the TSC and OSC should they be required. In an effort to streamline the TSC and OSC ERO, these positions are being removed from Section A.2.1 and Figure A-1 so that the diagram better reflects the positions required for specific activities associated with implementation of the BFN Emergency Plan. The tasks performed by these positions can be performed by the CECC Director, Site Emergency Director (SED), TSC Engineering Staff and OSC Department Briefers, respectively, and will not detract from implementation of Emergency Plan required activities. The site will maintain the capability of providing additional support on an as-needed basis in each of these areas.

The TSC and OSC positions of clerical staff and document control currently provide administrative support to the emergency response facilities and do not perform activities required to implement the Emergency Plan. The TSC Communicator position fulfills a support function by providing information on plant status to the engineering group in the event of a loss of electronic plant



parameter displays. This support function is also not required to implement the emergency plan. As a result, TVA proposes to remove these positions from Appendix A and maintain administrative positions in the site implementing procedures.

The term 'activated' as applied to the TSC and OSC indicates readiness to perform response actions in each facility. The facility is 'activated' once minimum activation staff positions (MASP) have been filled such that the facility is capable of performing command and control functions. The proposed change also applies the term to the CECC to ensure consistent implementation and prevent potential confusion.

Maintaining the appropriate number of on-shift Operations personnel, crediting technological advances available for on-shift responders, requiring initial dispatch of a sampling team within 60 minutes of an Alert or higher classification, reducing the number of immediate RP responders and extending the augmentation response times for TSC and OSC positions to 60 and 90 minutes are practical and prudent alternate methods of ensuring effective and timely emergency response.

Details associated with the revised ERO and key responsibilities and tasks as identified in NUREG-0654 Revision 1, are included in Section 3.2 of this enclosure.

### 2.3 BFN Emergency Plan Background

The Office of Nuclear Power Radiological Emergency Plan (ONP-REP) and Appendix A, Browns Ferry Nuclear Plant, hereafter referred to as the BFN Emergency Plan, Revision 0, was reviewed and approved by the NRC in the area of staffing as documented by NRC Safety Evaluation Report (SER) dated November 1, 1988 (Reference 1), and implemented in Revision 0 of Appendix A, Figure A-1, "Site Emergency Organization," and Figure A-2, "Minimum On-Shift Emergency Personnel," of the BFN Emergency Plan. These figures provided the site commitment to meet the guidance for on-shift staffing and augmentation goals including 30-minute and 60-minute responders established in Table B-1 of NUREG-0654, Revision 1. Subsequently, a change to the Core/Thermal Hydraulic Engineer augmentation time from 30 to 60 minutes was approved as noted in the NRC letter dated January 4, 1995 (Reference 2).

BFN has four Emergency Response Facilities (ERFs) augmenting the on-shift staff: the TSC, the OSC, the Central Emergency Control Center (CECC), and the Joint Information Center (JIC). During an emergency, the Shift Manager initially assumes the responsibility as the Site Emergency Director (SED). Emergency response by on-shift staff is directed by the SED from the control room (CR) until relieved by an augmenting staff with the subsequent activation of ERFs.

BFN uses four standard levels of emergency classification as described in NUREG-0654, Revision 1. Augmentation of the on-shift staff for an Unusual Event is optional and is left to the discretion of the SED. At the Alert or higher emergency classification levels, the TSC, OSC, CECC are activated. The JIC is activated at the Site Area Emergency or higher classification.

### **3.0 TECHNICAL EVALUATION**

#### **3.1 Technical Analysis**

This section discusses technological changes in plant systems, dose assessment, procedures, and training which have been completed to better support on-shift functions and ease operator burden. An on-shift analysis utilizing NEI 10-05, "Assessment of On-Shift Emergency Response Organization Staffing and Capabilities," methodology determined that the proposed changes did not result in conflicting duties for on-shift personnel.

##### **3.1.1 Plant Computer System**

When the BFN Emergency Plan Revision 0 was originally approved, the site utilized a combination of the General Electric GEPAC 4020 plant process computer and an Interim Safety Parameter Display System (ISPDS) that implemented NUREG-0696 and NUREG-0737 requirements. The design criteria for the ISPDS were based on the requirements of NUREG-0737, Supplement 1, regarding the need for a Safety Parameter Display System (SPDS) in the ERFs. The requirements specified for the SPDS were met or exceeded by a system of displays provided by the ISPDS and increased frequency of parameter updates. The operator interface consisted of a small number of displays located in the control room, computer room, and TSC.

Subsequently, ISPDS was replaced with an SAIC Integrated Computer System (ICS) which improved data reduction, accounting, and logging and included the ability to process information locally to improve overall system performance and plant monitoring capability.

In summary, benefits of the upgraded system include:

- Programming capability for automated response such as indication of critical parameter alarms
- Improved plant monitoring capability for Site Emergency Director functions
- Fewer keystrokes required to switch between graphical displays
- Real time plant data available through graphical displays
- Real time read-only plant data available on any desktop computer through the corporate network

Power for ICS basic functions is provided by the ICS-Uninterruptible Power Supply (UPS) inverters.

### 3.1.2 Dose Assessment

Specifically designed displays have been developed for obtaining the necessary information for performing dose assessment. These displays are available through the ICS and include specific information related to area radiation monitor readings, continuous air monitor readings, effluent release paths, and meteorological data.

#### 3.1.2.1 Previous on-shift dose assessment

In 1988, dose assessment was performed using charts and radiation monitor data from the control room. In 1996, a manual method using Nomograms was implemented to perform site dose assessments.

#### 3.1.2.2 Current on-shift dose assessment

Improvements have been made to the dose assessment program resulting in minimal user interface. Radiological dose assessment has benefited from technological advances that make it simpler and less time consuming. The primary method for performing dose assessment utilizes a spreadsheet which requires user input of data obtained from ICS. The spreadsheet automatically performs the required calculations. A backup manual method for performing dose assessment is available should the spreadsheet become unavailable.

### 3.1.3 Automated Call-Out Systems

When the BFN Emergency Plan Revision 0 was originally approved, the site utilized a Radio Paging system. The backup method was a call out system which is still in use with a directory of the ERO phone numbers to call in the event the paging system failed.

In 2012, TVA implemented the Tennessee Valley Authority Enterprise Emergency Notification System (TEENS). The system is hosted by a third-party vendor and is described as follows:

“The system is a web-based Notification service, offering immediate and simultaneous one-to-many communications using wired and wireless communication devices (telephones, Short Message Service (SMS) devices, email, pagers, and faxes). It provides automated and remote problem-solving capabilities to improve communication in large organizations—both internally and externally. It enables the Recipient to send an immediate reply to resolve the issue and/or convey a new status condition to the appropriate people and systems. The service provides recipient response functionality to close the communication loop between Initiator (sender) and Recipient (receiver). The System sends

time-sensitive notifications through a number of devices, including cell and land line telephones, one- or two-way SMS devices, email, one- or two-way pagers, and faxes. Messages may be sent to all communication devices at the same time, or in any defined order.”

- Automatically delivers messages to telephony, SMS, email, pager, and fax devices.
- Tracks delivery of notifications in real time.
- Allows recipients to select any number of predefined response choices.
- Securely stores and manages user contact data.
- Provides for grouping of users to better organize contacting recipients.
- Provides for grouping of notifications allowing delivery of different messages to different groups of recipients and devices.”

The TEENS allows for faster response and the use of multiple devices to be contacted simultaneously. The EP Radio Paging System also remains available for use.

#### 3.1.4 Procedure Improvements

##### 3.1.4.1 Emergency Operating Instructions and Abnormal Operating Instructions

Since the original emergency plan approval, Emergency Operating Instructions (EOIs), derived from Boiling Water Reactor Owners Group (BWROG) Emergency Response Guidelines, and Abnormal Operating Instructions (AOIs) have been improved through industry initiatives and plant-specific enhancements. EOIs use a symptom-based approach that requires less assessment and interpretation of plant conditions by the operating crews. AOIs have also been enhanced to improve usability and to provide guidance that is more comprehensive.

##### 3.1.4.2 Emergency Plan Implementation Procedures

The emergency classification scheme provided in Revision 0 of the BFN Emergency Plan was based on the guidelines in Appendix 1 of NUREG-0654/FEMA-REP-1, Revision 1. In 1995, BFN updated the classification methodology to NUMARC/NESP-007, Revision 2, “Methodology for Development of Emergency Action Levels,” in order to incorporate enhancements over the NRC and FEMA guidelines contained in NUREG-0654/FEMA-REP-1, Revision 1. The enhancements included use of an overview matrix of EAL

initiating conditions and threshold values that streamlined the process of evaluating EALs against plant conditions in the applicable Emergency Plan Implementing Procedures (EPIPs). In December 2017, BFN received NRC approval to transition to NEI 99-01, "Development of Emergency Action levels for Non-Passive Reactors," Revision 6 (Reference 6). NEI 99-01, Revision 6, represents additional improvements over NUMARC/NESP-007, Revision 2, including more clearly defined and readily observable EALs and thresholds, a more sound basis document, industry-standard instructions for emergency classification, and incorporation of features to improve human performance. BFN implemented NEI 99-01, Revision 6, in July 2018.

### 3.1.5 Training Improvements

#### 3.1.5.1 Operations Training

Training is used to drive and sustain performance at BFN. Training is administered through the application of the Systematic Approach to Training (SAT) to ensure that all training is conducted to the industry-accepted standards required to achieve and maintain accreditation by the National Academy of Nuclear Training.

Two dynamic plant simulators are used during Operations Training to provide hands-on experience and practice in the operation of the nuclear control room during normal, abnormal and emergency plant conditions. "As found" simulator performance evaluations are an integral component of the requalification training cycle. The program description document, TPD-LOR, "Fleet Licensed Operator Requalification Training Program Description" addresses the use of "As Found" evaluations. Evaluation scenarios are designed to be realistic and provide an opportunity for performance evaluation during a wide range of plant operating conditions including emergency conditions that require implementation of the station's Emergency Plan. Scenarios can vary in both length and complexity with some scenarios exceeding 90 minutes or more. Periodically, scenarios that were developed in accordance with the guidance specified by INPO Operations Department Standing Instruction ODSI-3 are used for control room team evaluations. These scenarios provide additional challenges to the crew's ability to prioritize activities to successfully manage complex situations. The proficiency of the control room team is evaluated in the areas of normal, abnormal and emergency operating procedures, critical safety function monitoring, core

damage prevention and mitigation, transient accident analysis and control and the bases of key actions for steps in the emergency operating procedures and their effects on the critical safety functions. NPG-SPP-17.8.8, "Licensed Operator Requalification Examination Development and Implementation," is the governing document for this training.

#### 3.1.5.2 Shift Technical Advisor (STA) Training

The Shift Technical Advisor (STA) training was developed to train the STA as an advisor to the control room team in accordance with the guidelines of NUREG-0737. In 1990, INPO developed additional training guidelines as detailed in INPO 90-003, Guidelines for Training and Qualifications of Shift Technical Advisors. The INPO guidelines describe the role of the STA and is reflected in Operations Department Procedure OPDP-1, Conduct of Operations. The STA performs independent assessments of plant parameters, monitors EOI flow paths, provides recommendations on appropriate corrective actions to restore plant parameters to acceptable values, and assesses whether core damage has occurred or appears imminent. The STA also assists the Shift Manager with operability, risk and reportability determinations.

#### 3.1.6 Increases in On-Shift Staffing

There has been an increase in on-shift staffing from that required in the NRC approved Plan. Increases in the number of operations department personal have provided additional plant response capability. A total of 26 individuals are identified for on-shift staffing which is an increase from the regulatory guidance provided by NUREG-0654 Revision 1 total of 10 individuals and the BFN Emergency Plan, Revision 0 approved staffing of 19 individuals. The proposed change includes the addition of an RP Technician to the on-shift complement such that there will be a total of three (3) on-shift RP technicians at the site. A comparative chart depicting on-shift and augmented staffing based on NUREG-0654 Revision 1, BFN Emergency Plan Revision 0, the current BFN Emergency Plan and proposed revisions is included in Attachment 3.

#### 3.1.7 Improvement Summary

The improvements in staffing, equipment, procedures and training that have occurred since initial approval of the BFN Emergency Plan have resulted in a significant increase in the on-shift capabilities and knowledge. Based on these improvements, TVA concluded that there would be no significant degradation or loss of any functional task as a result of the proposed augmentation times.

## 3.2 Functional Analysis

This analysis evaluates the effect of extending the augmentation times on the ability of the on-shift staff to perform the major tasks for the major functional areas of the BFN Emergency Plan. The analysis demonstrates that no degradation or loss of function would occur as a result of the proposed change.

The following is the result of the functional analysis performed for the major functional areas as described in NUREG-0654 Revision 1, Table B-1. In general, the analysis is organized to provide details for each functional area for (a) BFN Emergency Plan Revision 0, (b) the current BFN Emergency Plan, and (c) the proposed BFN Emergency Plan.

### 3.2.1 Plant Operations and Assessment of Operational Aspects

- a. NUREG-0654 Revision 1 assumes the function of plant operations and assessment of operational aspects is performed by on-shift staff throughout the emergency. Compared to NUREG-0654 Revision 1, the current plan has seven (7) additional Auxiliary Unit Operators (AUOs) and two (2) Senior Reactor Operators (SROs) to support this function and to support any of the major tasks such as repair and corrective actions or operational accident assessments. These changes improve the availability of Operations personnel to perform specified functions.
- b. In the current BFN Emergency Plan, the on-shift Operations staffing exceeds the guidance of NUREG-0654 Revision 1, Table B-1, as well as that prescribed in the last approved Plan from 1988. Additional personnel have been included in the existing on-shift complement for a total on-shift staffing of 26 personnel. This represents an increase of 16 when compared to the regulatory guidance stated in NUREG-0654 Revision 1, Table B-1 and an increase of five (5) when compared to the last NRC approved Plan in 1988. The additional staff on-shift helps ensure response to emergency events without requiring immediate augmentation.
- c. In the proposed Emergency Plan, Figure A-2 has been reformatted to more closely align with NUREG-0654, Revision 1, Table B-1. Additionally, Figure A-2 includes augmented response positions that are credited with command and control functions as defined in the BFN Emergency Plan. The total number of on-shift staff continues to exceed NUREG-0654 Revision 1, Table B-1 values. As stated in Section 3.1, an on-shift staffing analysis determined that the proposed changes did not result in conflicting duties for on-shift staff. Therefore, the proposed increase in augmentation times will not detract from the capability of on-shift personnel to support plant operations or the assessment of operational aspects major task.

### 3.2.2 Emergency Direction and Control

NUREG-0654 Revision 1 guidance indicates that the on-shift Emergency Coordinator assumes this function as a collateral duty where responsibility for overall direction of facility response may be transferred when ERFs are activated.

- a. In Revision 0 of the BFN Emergency Plan, the Shift Operations Supervisor would assume the duties of Site Emergency Director (SED) and would be responsible for emergency response efforts until relieved by the Plant Manager or alternate. No time requirements were established with the relief process, however, the SED in the TSC and the CECC Director were identified as 60-minute response positions. Revision 4 of the BFN Emergency Plan identified the staffing time for the CECC as approximately 60 minutes and Revision 12 included the requirement for the TSC and OSC to be activated within approximately 60 minutes of the declaration of an Alert or higher classification.
- b. The current revision of the BFN Emergency Plan maintains Revision 12 response requirements for the TSC, OSC and CECC.
- c. Under the proposed Plan, the response and activation times for the TSC, OSC and CECC are maintained at 60 minutes.

The proposed change aligns the term 'activated' in Appendix A with NRC approved change to REP Generic wording dated August 6, 2018 (Reference 8) with respect to responder readiness to perform response actions in each facility and defines the facility as 'activated' once minimum activation staff positions (MASP) have been filled such that the facility is capable of performing command and control functions. This definition is aligned with NSIR/DPR-ISG-01 (Reference 4) guidance and replaces terms such as 'staffed' and 'operational' as used in the current revision of the Appendix A of the BFN Emergency Plan. The time from the applicable emergency declaration to the time the facility is activated is the "augmentation time" for emergency responders.

The proposed change aligns the TSC, OSC and CECC activation criteria while maintaining support for relief of the Shift Manager and SED. Identification of MASP within each facility allows for facility activation in advance of the 60-minute response time.

The proposed revision to BFN Emergency Plan Appendix A, Figure A-1, identifies MASP in the TSC and OSC which support activation of the facilities within 60 minutes of an Alert or higher classification as:



- Site Emergency Director (TSC)
- RP Manager
- Operations Manager
- Operations Communicator
- MCR Communicator
- OSC Manager

The current revision to BFN Emergency Plan REP Generic, Figure 3-1, identifies MASP in the CECC that support activation of the facility within 60 minutes of an Alert classification:

- CECC Director
- Emergency Duty Officer (EDO)/Rep Staff
- Plant Assessment Manager
- Radiological Assessment Manager
- Dose Assessor
- State Communicator
- Core Damage Assessor

The response times for positions in the TSC and OSC, as noted in revised Figure A-1, are extended from 30 minutes to 60 minutes for MASP positions and from 60 minutes to 90 minutes for the remaining positions.

Upon activation of the CECC at the Alert or higher declaration, State/local Notification and Protective Action Recommendation functions transition from the Control Room to the CECC. Classification, Federal Notification and Emergency Exposure Authorization functions transition to the TSC upon activation of that facility. The improved availability of in-plant radiological information as discussed in Section 3.1.1 supports the performance of these functions in the Control Room for the first 60 minutes. A review of these functions completed during the OSA, did not identify any conflicts in the performance of on-shift duties as a result of the proposed change. The proposed changes are included in a diagram in Appendix A, Section 3.0 that shows the transfer process for the command and control functions.

The proposed BFN Emergency Plan commits to 60-minute activation times for the TSC and maintains the 60-minute activation requirement for the CECC. Once MASP is met for these facilities, the lead position declares that facility 'activated.' After activation of the TSC or CECC, the TSC SED and CECC Director, respectively, obtain a turnover briefing. The briefing concludes with the transfer of Command and Control functions from the SM to the appropriate facility leader as outlined in Section A.2 of the proposed BFN Emergency Plan that

states:

The following functions will normally transfer to the TSC:

- Classification
- Federal Notification
- Emergency Exposure Control for onsite personnel

The following functions will normally transfer to the CECC:

- State and Local Notifications
- Protective Action Recommendations
- Emergency Exposure Control for environmental sampling teams

The TSC retains the capability to perform all Command and Control functions should the CECC be unavailable for any reason. This process, as well as the 60-minute activation criteria for the TSC and CECC, ensures that the SM is relieved in a timely manner. Overall Command and Control of the TVA emergency response is the responsibility of the CECC Director after he/she has assumed Command and Control as stated in Section 3.3.1 of the current and proposed BFN Emergency Plan.

As a result, the proposed BFN Emergency Plan does not extend the timeframe during which the SM maintains responsibility for command and control functions. This change is acceptable in that it identifies minimum activation staffing positions in the TSC and CECC which enable transfer of the command and control functions from the control room in advance of the 60-minute activation requirement.

### 3.2.3 Notification/Communication Function

Per NUREG-0654 Revision 1, the Notification/Communication function included major tasks to notify licensee, state, local and federal personnel and maintain communications.

#### **Licensee Notification**

- a. Revision 0 of the BFN Emergency Plan identified notification of licensee off duty personnel by the TVA Operations Duty Specialist (ODS). This notification was completed at an Alert or higher classification for personnel assigned to respond to the TSC, OSC and CECC.
- b. The current BFN Emergency Plan maintains notification of off duty ERO by the ODS in accordance with implementing procedures at an Alert or higher classification for augmented responders in the TSC, OSC and CECC.

- c. The proposed BFN Emergency Plan maintains the Revision 0 notification process for augmented ERO in that personnel responding to the TSC, OSC and CECC will be notified at the Alert or higher classification by the ODS.

### **State, Local, and Federal Notification**

- a. In Revision 0 of the ONP-REP, the ODS was identified as the position responsible for notification of State/local personnel. Federal notifications were completed by the Shift Manager/SED. In Revision 97 of the BFN Emergency Plan, responsibility for the state/local and federal notification was assigned to the Shift Manager. The State/local notification function then transitioned to the CECC Director when that facility was activated. The CECC Director was a 60-minute response position. Responsibility for federal notifications transitioned from the Shift Manager/SED to the NRC Coordinator in the TSC where it remained for the duration of the event. In Revision 104 of the BFN Emergency Plan, the number of AUOs was increased in order to provide additional support for the Federal notification function.
- b. The current BFN Emergency Plan maintains the on-shift and augmented organization for the State/local and federal notification functions as described in Revisions 97 and 104.
- c. The proposed BFN Emergency Plan revises the State/local notification process by transitioning responsibility for State/local notifications from the Control Room to the State Communicator in the CECC. The transition will continue to occur at approximately 60 minutes after the declaration of an Alert or higher classification. The Operations Communicator in the TSC will assume the Federal notification duties from the Control Room approximately 60 minutes after declaration of an Alert or higher classification.

The proposed change will maintain the existing process for transition of the notification functions from on-shift resources within 60 minutes and so will not adversely impact this function.

### **Notification/Communication Function Summary**

Notification of licensee personnel is accomplished through an automated call-out process, which is initiated by the ODS. The proposed change does not impact the call-out process or the notification of licensee personnel.

The proposed revision to the BFN Emergency Plan does not adversely impact staffing associated with the notification function. State/local notifications will transition from the Shift Manager/SED in the Control

Room to the State Communicator upon activation of the CECC and Federal notifications will transition from the Control Room to the TSC within 60 minutes under the proposed revision as outlined in Section 3.2.2 of this Enclosure.

#### 3.2.4 Radiological Accident Assessment and Support of Operational Accident Assessment Function

Per NUREG-0654, Revision 1, the Radiological Accident Assessment and Support of Operational Accident Assessment functional area includes the Emergency Operations Facility (EOF) Director, Offsite Dose Assessment, Offsite, Onsite and Out-of-plant surveys and Chemistry/Radiochemistry major tasks.

##### **EOF Director Major Task**

Revision 0 of the BFN Emergency Plan identified the TSC as the initial response facility. Accident assessment, evaluation, and recovery functions were transitioned from the Shift Operations Supervisor in the Control Room to the SED who operated from the TSC rather than to an EOF position noted in NUREG-0654 Rev 1. Details regarding Direction and Control of Emergencies are discussed in Section 3.2.1 of this Enclosure as well as in the analysis of the Command and Control Task below.

##### **Assessment, Evaluation, and Recovery Task**

- a. In Revision 0 of the BFN Emergency Plan, the Shift Operations Supervisor, serving as the SED, was in charge of all activities at the site. The Shift Operations Supervisor/SED maintained responsibility for emergency assessment and evaluation functions until relieved by the TSC SED at an Alert or higher classification. The TSC SED was a 60-minute responder.
- b. The commitment for the 60-minute response time for the SED in the TSC is maintained in the current BFN Emergency Plan.
- c. In the proposed revision, the augmentation time for the SED in the TSC is maintained at 60 minutes and is included in Figure B-1 of Appendix A.

##### **Assessment, Evaluation, and Recovery Task Summary**

The proposed change to the BFN Emergency Plan does not alter the length of time that the assessment, evaluation, and recovery tasks are maintained by the Shift manager until relieved by the SED in the TSC.

##### **Command and Control Task**

- a. In Revision 0 of the BFN Emergency Plan, the Shift Operations

Supervisor, acting as the SED, was responsible for event response until relieved by the SED in the TSC at an Alert or higher classification. Upon staffing the CECC, overall command and control of the event was transitioned from the SED in the TSC to the CECC Director. Revision 12 included activation of the TSC and CECC within 60 minutes of an Alert or higher classification.

- b. The current BFN Emergency Plan maintains Revision 12 sequence of transfer of command and control functions from the Control Room to the TSC and, subsequently, to the CECC at an Alert or higher classification.
- c. The proposed change maintains facility activation time of 60 minutes for the TSC and CECC. TSC and OSC MASP as identified in the BFN Emergency Plan Figure, A-1, as well as CECC positions identified in Figure 3-1 are considered 60-minute responders who are required to be in place and ready to accept command and control functions in order for the facility to be declared 'activated'. These positions are related to the command and control functions of Classification, Notification, Protective Action Recommendations (PARs), and Emergency Exposure authorization based on guidance in NSIR/DPR-ISG-01 and NRC IP 71114.03 (References 4 and 5). Once the facilities are activated, command and control can be transitioned from the Control Room. A diagram that outlines the transition of command and control functions has been added to Appendix A in Section A.2. The CECC Director will continue to retain overall responsibility for the TVA emergency response under the proposed change in accordance with Section 3.3.1 of the BFN Emergency Plan. These changes allow for transition of command and control functions from the Control Room to the TSC and CECC in advance of the 60-minute activation requirement providing for earlier relief of the on-shift staff of event-related tasks.

The proposed BFN Emergency Plan commits to 60-minute activation times for the TSC and maintains the 60-minute activation requirement for the CECC. Once MASP is met for these facilities, the lead position declares that facility 'activated'. After activation of the TSC or CECC, the TSC SED and CECC Director, respectively, obtain a turnover briefing. The briefing concludes with the transfer of Command and Control functions from the SM to the appropriate facility leader as outlined in Section A.2 of the proposed BFN Emergency Plan which states:

The following functions will normally transfer to the TSC:

- Classification
- Federal Notification

- Emergency Exposure Control for onsite personnel

The following functions will normally transfer to the CECC:

- State and Local Notifications
- Protective Action Recommendations
- Emergency Exposure Control for environmental sampling teams

The TSC retains the capability to perform all Command and Control functions should the CECC be unavailable for any reason. This process, as well as the 60-minute activation criteria for the TSC and CECC, ensures that the SM is relieved in a timely manner. Overall Command and Control of the TVA emergency response is the responsibility of the CECC Director after he/she has assumed Command and Control as stated in Section 3.3.1 of the current and proposed BFN Emergency Plan.

As a result, the proposed BFN Emergency Plan does not extend the timeframe during which the SM maintains responsibility for command and control functions. This change is acceptable in that it identifies minimum activation staffing positions in the TSC and CECC which enable transfer of the command and control functions from the control room in advance of the 60-minute activation requirement.

### **Command and Control Task Summary**

The proposed revision to the BFN Emergency Plan maintains the requirement for staffing the TSC, OSC and CECC at the Alert or higher event classification level and identifies specific positions associated with command and control responsibilities based on guidance in NSIR/DPR-ISG-01 (Reference 4), so that transfer of these functions may occur earlier in the response process. As a result, the proposed changes will not adversely impact performance of command and control functions and maintains the existing requirements for overall direction and coordination of TVA event response by the CECC Director position.

### **Offsite Dose Assessment Major Task**

- a. In Revision 0 of the BFN Emergency Plan, performance of dose assessment on-shift was not specifically discussed. In Revision 35, site Radiological Control (RadCon) is identified as being responsible for performance of this function in advance of CECC staffing. The dose assessment function transitioned to the Dose Assessor in the CECC, a 60-minute response position, upon activation of that facility.
- b. The current BFN Emergency Plan maintains performance of the dose assessment function by on-shift RP personnel as noted in Revision 35

as well as the transition to augmented ERO positions.

- c. In the proposed change, performance of the on-shift dose assessment function will be assigned to the on-shift Chemistry Technician. This change will allow for the performance of radiological assessment and protective action functions by on-shift RP personnel. It was noted during the OSA that collection of Chemistry samples is not required within the first 90 minutes after an event. As a result, the Chemistry Technician on-shift is available to perform the dose assessment function without conflicts until relieved by the CECC Dose Assessor when that facility is activated within 60 minutes of event declaration.

### **Offsite Surveys Major Task**

- a. In Revision 0 of the BFN Emergency Plan, Offsite surveys were initiated by the Radiological Assessment Manager in the CECC at a Site Area Emergency or higher classification with one sampling team dispatched within 30 minutes and a second sampling team within 60 minutes.
- b. The current BFN Emergency Plan maintains the commitment for initiation of offsite surveys at a Site Area Emergency or General Emergency classification, with the first sampling team dispatched within 30 minutes and an additional sampling team within 60 minutes.
- c. In the proposed change, augmentation would be extended such that the first offsite sampling team is dispatched at 60 minutes and the second team at 90 minutes after an Alert or higher classification rather than 30 and 60 minutes, respectively, at a Site Area Emergency or higher classification. Each sampling team is comprised of an RP Lead and a support position responsible for driving the sampling team vehicle as noted in Figure A-2 of the proposed BFN Emergency Plan.

A review of field team monitoring functions shows that the use of in-plant and effluent monitors effectively supports event classification as well as onsite and offsite protective actions such that performance of this major task at 60 minutes does not adversely impact site response. Initial field team response involves primarily environmental radiation / contamination assessments, plume tracking, and the use of dose assessment instrumentation. Actions include driving to and from field positions, reading dose rate instrumentation, and communicating results to the CECC. The first sampling team can effectively track any potential plume and/or cover the necessary area to identify whether a plume exists during the early stages of an event. The second sampling team, augmented at 90 minutes, will support continued plume tracking capability as well as sampling activities.

Initiation of environmental sampling at a lower classification level will continue to support timely performance of the function even with the extended dispatch time. Therefore, this change does not adversely impact performance of the offsite survey major task and is consistent with Industry and NRC public meeting discussions.

### **Onsite (out of plant) Major Task**

- a. Revision 0 of the BFN Emergency Plan identified 2 RadCon Technicians (Techs) on-shift who were responsible for performance of activities associated with radiological accident support and onsite protective actions as outlined in site procedures. A RadCon Manager position was augmented as soon as possible after notification to provide oversight of these functions, and the Radiological Assessment Manager (RAM) position in the CECC was augmented at 60 minutes. Revision 4 of the BFN Emergency Plan restructured information regarding RP support available at the site by splitting the 12 RP individuals into 30 and 60-minute augmentation times consisting of 6 RP individuals each. This change more closely aligned with NUREG-0654, Rev 1 Table B-1 augmented response guidance.
- b. The current BFN Emergency Plan maintains the Revision 4 organizational structure for two on-shift RP positions and augmented response by the RadCon Manager and RAM at 60 minutes as well as six (6) RP individuals at 30 minutes and six (6) RP individuals at 60 minutes.
- c. The proposed change revises the structure for RP support of an event and modifies the augmentation requirements from a total of 6 RP individuals at 30 minutes to a total of 4 RP individuals at 60 minutes and from a total of 6 additional RP individuals at 60 minutes to a total of 4 additional RP individuals at 90 minutes. The proposed change revises the commitment for the number of responders at 60 and 90 minutes to better coincide with the number of individuals required to perform radiological assessment and protective action functions. Of the 4 RP positions augmented at 60 minutes, 1 RP Technician will be assigned to support Onsite (out-of-plant) and In-Plant tasks. Similarly, 1 RP Technician augmented at 90 minutes will also be assigned to support performance of these activities as noted in Figure A-2 of the proposed BFN Emergency Plan.

Onsite (out of plant) survey teams are typically used to verify the status of a potential release. Installed effluent radiation monitors and in-plant radiation monitors would be able to detect any radioactive release quickly and accurately. Quantification of a radioactive release is determined by dose assessment that can be performed on-shift. Improvements in the dose assessment process as discussed in Section 3.1.2 of this Enclosure facilitate simplified performance of the



dose assessment function on-shift. Onsite, out of plant surveys can be used for verification of release or downwind monitoring as needed. Offsite survey data is used to validate dose assessment. An offsite survey would be available after the first 60 minutes following emergency classification.

Review of onsite monitoring functions shows that the use of in-plant and effluent monitors effectively supports event classification and onsite radiological assessment activities such that performance of this major task at 60 minutes rather than 30 minutes does not adversely impact site response. Additionally, the use of in-plant monitoring capability allows for determination of release status without requiring assignment of a dedicated technician to specifically perform an onsite (out-of-plant) survey. Rather, such surveys can be completed periodically as assigned by the OSC, based on event conditions. Use of this monitoring capability reduces the burden associated with completion of surveys and therefore, this reduces the need for dedicated personnel to perform these surveys. This, combined with the improved capabilities associated with in-plant monitoring and availability of this data in remote locations allow for assignment of augmented RP personnel for the performance of both onsite (out-of-plant) and in-plant surveys as needed for a given emergency condition, thus reducing the number of RP Technicians needed for performance of these activities.

The proposed change does not adversely affect performance of the onsite surveys major task and is consistent with industry and NRC public meeting discussions.

### **In-Plant Surveys Major Task**

- a. Revision 0 of the BFN Emergency Plan identified two (2) RadCon Techs on-shift who were responsible for performance of radiological response functions. A RadCon Manager position was augmented as soon as possible after notification and provided oversight of these functions. Additionally, the Radiological Assessment Manager (RAM) position in the CECC was augmented at 60 minutes. Revision 4 included the augmentation of an additional 6 RP individuals at 30 minutes and 60 minutes.
- b. The current BFN Emergency Plan maintains the Revision 4 commitment for 2 on-shift RP positions and augmented response by 6 RP individuals at 30 minutes and 6 RP individuals at 60 minutes.
- c. The proposed change maintains the commitment for 2 on-shift individuals responsible for in-plant surveys and extends the response time from a total of 6 RP individuals from 30 minutes to a total of 4 RP individuals at 60 minutes and from a total of 6 additional RP

individuals at 60 minutes to a total of 4 RP individuals at 90 minutes. Of the 4 RP positions augmented at 60 minutes, 1 RP Technician will be assigned to support Onsite (out-of-plant) and In-Plant tasks. Similarly, 1 RP Technician augmented at 90 minutes will also be assigned to support performance of these activities as noted in Figure A-2 of the proposed BFN Emergency Plan.

As previously stated in Section 3.1.1 of this Enclosure, benefits of the current level of computer upgrades include:

- Programming capability for automated response such as indication of critical parameter alarms
- Improved plant monitoring capability for Site Emergency Director functions
- Fewer keystrokes required to switch between graphical displays
- Real time plant data available through graphical display
- Real time read-only plant data is available on any desktop computer throughout the corporate network

Use of improved access to real-time plant data allows on-shift RP resources to provide the necessary support for the performance of onsite and in-plant functions for an additional 30 minutes without conflicts.

### **Chemistry/Radiochemistry Major Task**

- a. Revision 0 of the BFN Emergency Plan included 2 on-shift Chemistry (Chem) Lab Technicians with an additional Chem Lab Technician augmented at 60 minutes. In 2003, BFN received NRC approval to reduce the number of chemistry tasks by eliminating some chemical analyses and deferring others for 8 to 24 hours after an accident condition via Post Accident Sampling Licensing Amendment dated May 9, 2003 (ML031290543) (Reference 7).
- b. The current BFN Emergency Plan maintains an on-shift Chemistry Technician with augmentation by a second Chemistry Technician in 60 minutes.
- c. The proposed change maintains the commitment for the on-shift Chemistry Technician position, transitions the on-shift dose assessment function to this position and extends augmentation of a second Chemistry Technician to 90 minutes. TVA determined in the On-Shift Staffing Analysis that collection of Chemistry samples is not required within the first 90 minutes after an event. As a result, re-assignment of dose assessment and extension of the augmented response time by 30 minutes will not adversely impact performance of the Chemistry/Radiochemistry Major Task.

## **Offsite Dose Assessment, Offsite Survey, Onsite (out of plant), In-Plant Survey and Chemistry /Radiochemistry Major Task Summary**

The Dose Assessment, In-Plant Survey, Onsite (out of plant), Offsite Survey and Chemistry/Radiochemistry major tasks are impacted by the proposed change. Reassignment of the dose assessment function to on-shift Chemistry aligns with the delayed need for performance of chemistry sampling as determined by the OSA and does not conflict with on-shift responsibilities. Transition of the dose assessment function from on-shift to the Dose Assessor at the CECC within 60 minutes maintains the timeframe for performance of this function on-shift. In-Plant Survey and Onsite (out of plant) tasks would be performed by on-shift RP individuals for an additional 30 minutes before augmentation by additional RP personnel. The improved use of in-plant, effluent, and area radiation monitors effectively supports event classification and onsite radiological assessment activities such that performance of these major tasks at 60 minutes rather than 30 minutes does not adversely impact site response. Additionally, use of these capabilities enhances performance of tasks associated with these functions by augmented personnel such that augmentation of 3 RP Technicians at 60 minutes and an additional 3 RP Technicians at 90 minutes continues to maintain protection of public health and safety. Offsite Surveys would be performed by the first Sampling Team at 60 minutes rather than 30 minutes after the event. Each Team includes a 4<sup>th</sup> RP Technician as Survey Leader at 60 minutes with an additional 4<sup>th</sup> RP Technician augmented at 90 minutes. Initiation of environmental sampling at a lower classification level will continue to support timely performance of the function even with the extended dispatch time. Therefore, this change does not adversely impact performance of the offsite survey major task.

### **3.2.5 Plant System Engineering, Repair and Corrective Actions Function**

Per NUREG-0654 Revision 1, the Plant System Engineering, Repair and Corrective Actions functional area includes Technical Support and Repair and Corrective Actions Major Tasks. NUREG-0654, Rev 1, Table B-1 notes that Mechanical Maintenance/Radwaste Operator and Electrical Maintenance/Instrument and Control Technician expertise may be provided by shift personnel assigned other functions.

#### **Technical Support Major Task**

- a. Revision 0 of the BFN Emergency Plan included an STA on-shift position that was responsible for operational aspects and reported to the Shift Operations Supervisor. The Core Thermal Hydraulics function was augmented at 30 minutes by a Core/Thermal Hydraulic Engineer and reported to the Technical and Engineering Supervisor in the TSC. Staffing by Electrical and Mechanical Engineering was

augmented at 60 minutes after the event. In Revision 24, the augmented response time for the Core/Thermal Hydraulic Engineer was changed from 30 minutes to 60 minutes. This change was approved by Letter from the NRC to the BFN, dated January 4, 1995 (Reference 2).

The Rad Waste Operator (RWO) position was added to the BFN Emergency Plan in Revision 16 as a 60-minute augmented responder. This change aligned with NUREG 0654, Revision 1, Table B-1.

- b. The current BFN Emergency Plan maintains the Revision 24 commitment for the Core/Thermal Hydraulic Engineer position and the Revision 16 commitment for the RWO with a response time of 60 minutes from an Alert or higher classification. The Core/Thermal Hydraulic Engineer position is responsible for supporting the operating crew in bringing the reactor core to the desired condition, determining the amount of failed fuel and recommending fuels-related priorities in recovery/re-entry operations. Subsequent staffing by Electrical and Mechanical Engineering continues to take place at 60 minutes after the event.
- c. The proposed change utilizes the Core Damage Assessor in the CECC, a 60-minute response position added to the CECC in NRC approved change dated August 6, 2018 (Reference 8), and extends the response time for the Core/Thermal Hydraulic Engineer and RWO to 90-minutes. Additionally, the proposed change maintains the 60-minute response time for the Electrical and Mechanical Engineering positions.

Use of the Core Damage Assessor position allows for transfer of the core thermal hydraulics function from the Control Room to the CECC within the existing 60-minute timeframe. As a result, changes in response time for the Core/Thermal Hydraulic position will not require performance of this function by the on-shift STA for an additional period. As was stated in Section 3.1.5.2 of this Enclosure, improvements in STA training as well as improvements in plant system displays and data availability had reduced the burden for the on-shift STA in performance of plant monitoring activities. The STA remains a dedicated resource on-shift for the performance of Technical Support functions and, as demonstrated in the On-Shift Staffing Analysis, is able to perform this task for 60 minutes without conflicts.

The OSA did not identify actions requiring response by the RWO for the first 90 minutes after event classification. As a result, the proposed change would extend the RWO response time from

60 minutes to 90 minutes.

### **Repair and Corrective Actions Major Task**

- a. In Revision 0 of the BFN Emergency Plan, on-shift plant stabilizing functions were completed by maintenance personnel. Augmented staff to address repair and corrective actions was included in Revision 16 with the addition of Electrical Maintenance and I&C Maintenance personnel who reported to the OSC within 30 minutes at the Alert or higher classification as well as additional augmentation at 60 minutes by a Mechanical Maintenance and Electrical Maintenance craft personnel. In Revision 100, the number of Unit Operators (UOs) and Auxiliary Unit Operators was increased to 4 each. In Revision 104, the number of AUO's was increased to 9.
- b. The current BFN Emergency Plan maintains the Revision 104 on-shift AUO and maintenance craft staffing as well as augmented maintenance response at 30 and 60 minutes at an Alert or higher classification.
- c. The proposed change would remove maintenance positions from on-shift and modify augmented response by extending the 30-minute response time to 60 minutes for Electrical Maintenance, maintaining the 60-minute response time for Mechanical Maintenance and extending the I&C Maintenance response time from 30 minutes to 90 minutes.

The primary concern for on-shift and augmented maintenance capabilities is the repair and restoration of the Emergency Core Cooling System (ECCS). The design of the General Electric boiling water reactors for BFN is based upon proven technological concepts developed during the development, design, and operation of numerous similar reactors. Section 1.5.2.6.1 of the BFN Updated Final Safety Analysis Report (UFSAR) provides, in part, the following design criteria for the BFN ECCS:

Essential safety actions shall be carried out by equipment of sufficient redundancy and independence that no single failure of active components can prevent the required actions. For systems or components to which IEEE-279 is applicable, single failures of passive electrical components will be considered, as well as single failure of active components in recognition of the higher anticipated failure rates of passive electrical components relative to passive mechanical components.

The design of nuclear safety systems and engineered safeguards shall include allowances for environmental

phenomena at the site (e.g., weather extremes and proximity to other high energy systems). Furthermore, electrical equipment in these systems shall be capable of performing their safety function as required under environmental conditions associated with all normal, abnormal, and plant accident operation.

The ECCS, as described in Section 6 of the BFN UFSAR, consists of one (1) High Pressure Coolant Injection (HPCI) system, two (2) independent Low Pressure Core Spray (LPCS) loops, two (2) independent Low Pressure Coolant Injection (LPCI) loops, and one (1) Automatic Depressurization System (ADS) with six (6) 25% capacity relief valves.

The ECCS utilizes redundant AC and DC power. The electrical circuits associated with redundant or counterpart divisions, components, or subsystems of electrical systems important to safety are separated from each other by means of spacing or barriers or analysis to demonstrate functional redundancy. The separation concept places all electrical equipment of the ECCS in either Division I or Division II. These two divisions include the electric power, control, and signal circuits for this equipment. Eight (8) diesel generators, (four for Units 1 and 2, and four for Unit 3) provide standby power to be used on loss of the Normal Auxiliary Power System. The diesel generators supply all AC loads necessary for the safe shutdown of the plant under accident or non-accident conditions.

The six (6) main steam relief valves utilized for the ADS are each equipped with an air accumulator in addition to redundant sources of pneumatic pressure provided by the Drywell Control Air (DCA) and Containment Atmospheric Dilution (CAD) systems.

The ECCS pumps, piping, controls, and instrumentation are separated and/or protected such that no single physical event or the physical effects of a design basis accident will result in less than the minimum combination of ECCS components being available. This includes meeting the site specific seismic design requirements.

Likewise, reliability and redundancy of the controls and instrumentation for the ECCS is such that no failure of a single initiating sensor either prevents or falsely starts the initiation of these cooling systems or prevents the combined cooling systems from providing the core with adequate cooling.

The BFN ECCS design provides redundant capability sufficient for all size line breaks up to and including the design basis break. The individual functions of the ECCS also meet the design criteria over

various ranges of break sizes in the nuclear system. Their integrated performance provides adequate and timely core cooling over the entire spectrum of LOCAs up to and including the design basis LOCA even with concurrent loss of offsite AC power.

Normal operating status and deviations from this status are controlled by the BFN Technical Specifications. System performance is tracked and trended by the site and demonstrates a high degree of reliability. System health requirements are maintained based on NRC Performance Indicators for system availability and functional failures, which are an integral part of the Reactor Oversight Process (ROP). Additionally, reliability is driven by Maintenance Rule performance criteria.

Crediting the robust ECCS capability and protection against single point failures provides the basis for removal of maintenance personnel from on-shift and extension of augmentation response times for these positions to 90 minutes. As a result, the proposed changes do not result in a reduction in response capability.

### **Plant System Engineering, Repair and Corrective Actions Function Summary**

The Plant System Engineering, Repair and Corrective Actions functions are not adversely impacted by the proposed change. Core thermal hydraulics major tasks will continue to be performed by on-shift personnel and transition to the CECC within approximately 60 minutes. Extension of the RWO 60-minute response time to 90 minutes and extension of augmented maintenance and engineering response times to 60 and 90 minutes do not adversely impact completion of this major task.

#### **3.2.6 Protective Actions (In-Plant) Function**

Per NUREG-0654 Revision 1, the Protective Actions functional area includes the Radiation Protection major task, specifically Access Control, HP Coverage for repair and corrective actions, search and rescue first aid and firefighting, personnel monitoring and dosimetry. NUREG-0654 Table B-1 notes that HP Technician expertise may be provided by shift personnel assigned other functions.

- a. Revision 0 of the BFN Emergency Plan provided for 2 on-shift RP positions. Revision 4 of the Plan added augmented response requirements which provided for 6 RP positions within 30 minutes and an additional 6 RP positions within 60 minutes in accordance with NRC guidance documents.
- b. The current Plan maintains the on-shift and augmented RP response as stated in Revision 4 of the BFN Emergency Plan.

- c. The proposed Plan maintains the 2 on-shift RP positions for the Radiological Accident Assessment Major Functional Area and adds a third RP position on-shift for performance of activities associated with the Protective Actions Major Functional Area. Augmented resources for this functional area include 2 RP Technicians at 60 minutes and an additional 2 RP Technicians at 90 minutes. Justification for these changes is addressed in the paragraphs below.

### **Access Control/Dosimetry**

The performance of access control and dosimetry activities is primarily completed through the use of Electronic Dosimeters (EDs) which are obtained prior to entry into radiologically controlled areas (RCA). The ED is also used as a “key” to unlock turnstiles to gain access to the RCA. Dosimeters in the Fast Entry mode are available to Fire Operations and the Control Room to allow rapid entry into the RCA in the event of an emergency. This ensures that the teams dispatched to the in-plant areas to perform activities during a declared emergency will be afforded ample warning/alarm prior to exceeding their allowed dose or dose rate. Use of the ED and RWP process eliminated the need for access control/dosimetry oversight by an RP Technician for the initial response actions to an event. The use of electronic systems for RCA access has improved efficiency in the dispatch of personnel into the field and reduced the burden of the on-shift RP Technicians.

Through the use of improved access control technology and addition of a third on-shift RP Technician, extension of the RP position response times from 30 minutes to 60 minutes does not adversely impact performance of the Access Control / Dosimetry major tasks on-shift.

### **HP Coverage for Repair and Corrective Actions, Search and Rescue First Aid and Firefighting**

The performance of the HP Coverage for Repair and Corrective action activities is the responsibility of the on-shift RP personnel. This function is supported by the use of electronic dosimetry for in-plant teams for the purpose of ensuring ample warning prior to exceeding allowed doses or dose rates. Additionally, area radiation monitoring capabilities have greatly improved through the implementation of electronic remote monitoring systems. By utilizing these systems one technician is able to monitor numerous locations from the remote monitoring room.

Use of improved radiological monitoring technology, as well as the addition of a third RP Technician on-shift, permits extension of the RP position response time from 30 minutes to 60 minutes and does not adversely impact performance of the HP Coverage for Repair and Corrective Actions, Search and Rescue First Aid and Firefighting major



tasks on-shift.

### **Personnel Monitoring/Habitability**

The performance of personnel monitoring for on-shift event responders is provided by an on-shift RP position. This function will be performed for an additional 30 minutes by on-shift personnel as result of the proposed change. This function is supported by the use of electronic dosimetry for in-plant teams for the purpose of ensuring ample warning prior to exceeding allowed doses or dose rates. Additionally, electronic area radiation monitoring provides updated real time information for limited areas that allows the technicians to not only brief workers on the current radiation levels but also see immediately when changes to habitability might be taking place throughout the plant.

Performance of habitability activities are associated with the ERFs after they are staffed by augmented personnel. As augmentation of onsite facilities is being extended to 60 minutes in the proposed change, staffing of RP resources would occur simultaneously for each facility under the proposed change, therefore, performance of this function is not adversely impacted.

### **Protective Actions (In-Plant) Function Summary**

The proposed change adds a third RP Technician on-shift in support of the Protective Action/HP Coverage task and extends the 30-minute response time for Major Tasks associated with this function to 60 minutes. As a result, on-shift RP personnel will maintain responsibility for these functions for an additional 30 minutes. BFN has implemented improvements in technology in the areas of electronic dosimetry and access control, as discussed above, which reduce the need for RP Technician actions in each of these areas during the early stages of event response as well as increase the number of on-shift RP Technicians to a value greater than is required under NUREG-0654, Revision 1.

Additionally, an extension of the response time for the RP personnel responsible for personnel monitoring/habitability coincides with the 60-minute activation time for the TSC and OSC as described in the proposed Plan.

The combination of added on-shift resources, improvements in technology, and aligning of facility activation times ensures that performance of these functions are not adversely impacted by the proposed change.

#### **3.2.7 Firefighting Function**

Per NUREG-0654 Rev 1, the Firefighting functional area is addressed by use of a Fire Brigade and managed in accordance with site Technical

#### Specifications.

- a. In Revision 0, of the BFN Emergency Plan, Fire Fighting response was provided by on-shift fire brigade personnel.
- b. The current BFN Emergency Plan maintains the Firefighting function commitment through the use of dedicated on-shift Fire Brigade members in accordance with the Fire Protection Report.
- c. The proposed change maintains this commitment by including the 5 on-shift Fire Brigade members currently identified in the Fire Protection Report into Figure A-2 of the BFN Emergency Plan. Fire protection staffing was evaluated in accordance with the requirements of 10 CFR 50 Appendix E.IV.A.9 and found to be sufficient.

#### 3.2.8 Rescue Operations and First-Aid Function

NUREG-0654 Rev 1, Table B-1 notes that this function may be provided by shift personnel assigned other functions.

- a. BFN Emergency Plan Revision 0, provided for first aid treatment for injured personnel by qualified on-shift personnel.
- b. The current BFN Emergency Plan maintains this commitment through the use of on-shift First Aid Responders.
- c. The proposed change does not alter this commitment, therefore, the Rescue Operations and First Aid functional area is not impacted by the proposed change.

#### 3.2.9 Site Access Control and Personnel Accountability Function

NUREG-0654 Rev 1, the Site Access Control and Personnel Accountability functional area is addressed by Security personnel in accordance with the Site Security Plan.

- a. In BFN Emergency Plan Revision 0, site access control and accountability was identified as a function of the Security Supervisor on-shift and is detailed in the Site Security Plan.
- b. The current BFN Emergency Plan maintains this commitment through the Physical Security Plan.
- c. The proposed change does not alter this commitment. Therefore, the Site Access Control and Personnel Accountability functional area is not impacted by the proposed change.

### 3.3 Conclusions

The proposed changes continue to support the functional areas of the Emergency Plan, continue to ensure the protection of the health and safety of the

public and site personnel, and will not present a significant burden to the on-shift personnel.

Elimination of on-shift Maintenance positions and extending augmented response times from 30 and 60 minutes to 60 and 90 minutes, given the diverse and redundant capabilities of plant systems, do not adversely affect the site's ability to respond to an event nor do they delay performance of maintenance functions. As the processing of radwaste occurs as part of normal operator duties outside of the emergency response process, the response time for the augmented RWO position is being extended from 60 minutes to 90 minutes. These changes will not adversely impact the site's ability to respond to an event or delay performance of the maintenance functions.

Additionally, re-alignment and extension of the RP staffing augmentation response times from a total of 6 RP individuals at 30 minutes and a total of 6 additional RP individuals at 60 minutes to a total of 4 RP individual at 60 minutes and 4 additional RP individuals at 90 minutes, does not adversely affect the performance of radiological assessment or protective action functions associated with event response. TVA has incorporated new technologies in access control and dosimetry, installed in-plant monitoring capability, and will transition the on-shift dose assessment function from RP to Chemistry such that the emergency response functions identified in the BFN Emergency Plan will continue to be performed. The proposed changes do not result in a reduced ERO capability to effectively respond to an emergency.

The proposed change extends the times at which the initial and secondary sampling teams are dispatched by 30-minutes each, however, sampling teams will be dispatched at an Alert or higher classification rather than at a Site Area Emergency or General Area Emergency. Initiation of environmental sampling at a lower classification will continue to support timely performance of the function even with the extended dispatch time.

Therefore, the proposed changes continue to ensure the BFN Emergency Plan will meet 10 CFR 50.54(q)(2), the requirements of 10 CFR 50 Appendix E, and the planning standards of 10 CFR 50.47(b).

## 4.0 REGULATORY EVALUATION

### 4.1 Applicable Regulatory Requirements/Criteria

#### Title 10 Code of Federal Regulations 50.47(b)(1) and (2):

(b) The onsite and, except as provided in paragraph (d) of this section, offsite emergency response plans for nuclear power reactors must meet the following standards:

- (1) *Primary responsibilities for emergency response by the nuclear facility licensee and by State and local organizations within the Emergency Planning Zones have been assigned, the emergency*

*responsibilities of the various supporting organizations have been specifically established, and each principal response organization has staff to respond and to augment its initial response on a continuous basis.*

- (2) *On-shift facility licensee responsibilities for emergency response are unambiguously defined, adequate staffing to provide initial facility accident response in key functional areas is maintained at all times, timely augmentation of response capabilities is available and the interfaces among various onsite response activities and Offsite support and response activities are specified.*

The existing BFN Emergency Plan includes onsite and Offsite emergency response plans that meet the requirements listed above. This LAR proposes to remove maintenance personnel from shift, extend the current staff augmentation response times in one case, from 30 minutes to 90 minutes and in remaining cases, extend 30 and 60-minute response times to 60 and 90 minutes. The BFN Emergency Plan will continue to have onsite and Offsite emergency response plans that meet 10 CFR 50.47(b).

Relevant portions of Title 10 Code of Federal Regulations 50.54(q) are as follows:

(q) Emergency Plans

- (1)(iv) *Reduction in effectiveness means a change in an emergency plan that results in reducing the licensee's capability to perform an emergency planning function in the event of a radiological emergency.*
- (2) *A holder of a license under this part, or a combined license under part 52 of this chapter after the Commission makes the finding under § 52.103(g) of this chapter, shall follow and maintain the effectiveness of an emergency plan that meets the requirements in appendix E to this part and, for nuclear power reactor licensees, the planning standards of § 50.47(b).*
- (4) *The changes to a licensee's emergency plan that reduce the effectiveness of the plan as defined in paragraph (q)(1)(iv) of this section may not be implemented without prior approval by the NRC. A licensee desiring to make such a change after February 21, 2012 shall submit an application for an amendment to its license. In addition to the filing requirements of §§ 50.90 and 50.91, the request must include all emergency plan pages affected by that change and must be accompanied by a forwarding letter identifying the change, the reason for the change, and the basis for concluding that the licensee's emergency plan, as revised, will continue to meet the*

*requirements in appendix E to this part and, for nuclear power reactor licensees, the planning standards of § 50.47(b).*

The existing BFN Emergency Plan meets the planning standards of 10 CFR 50.47(b) and 10 CFR 50 Appendix E as required by 10 CFR 50.54(q)(2). This LAR proposes to remove maintenance personnel from shift, increase the current staff augmentation response times in one case, from 30 minutes to 90 minutes and in remaining cases, extend 30 and 60-minute response times to 60 and 90 minutes. These proposed changes are considered a reduction in effectiveness as defined in 10 CFR 50.54(q)(1)(iv) and require submittal based on 10 CFR 50.54(q)(4). Therefore, Tennessee Valley Authority is submitting this LAR pursuant to 10 CFR 50.90.

The BFN Emergency Plan will continue to meet the requirements of 10 CFR 50.54(q)(2) by maintaining the effectiveness of the Emergency Plan such that it meets the requirements of 10 CFR 50 Appendix E, and the planning standards of 10 CFR 50.47(b).

Relevant portions of Title 10 Code of Federal Regulations Part 50 Appendix E.IV are as follows:

A. *Organization*

*The organization for coping with radiological emergencies shall be described, including definition of authorities, responsibilities, and duties of individuals assigned to the licensee's emergency organization and the means for notification of such individuals in the event of an emergency. Specifically, the following shall be included:*

- A.9. *By December 24, 2012, for nuclear power reactor licensees, a detailed analysis demonstrating that on-shift personnel assigned emergency plan implementation functions are not assigned responsibilities that would prevent the timely performance of their assigned functions as specified in the emergency plan.*

The existing BFN Emergency Plan includes a description of the organization, including definition of authorities, responsibilities, and duties of individuals. The current Emergency Plan (Generic Revision 109, Appendix A Revision 110) is in compliance with 10 CFR 50 Appendix E.IV.A.9. This LAR proposes to remove maintenance personnel from shift and increase the current staff augmentation response times in one case, from 30 minutes to 90 minutes and in remaining cases, extend 30 and 60-minute response times to 60 and 90 minutes. A staffing analysis has been performed to demonstrate continued compliance with 10 CFR 50 Appendix E.IV.A.9. The staffing analysis supports acceptability of this increase in staff augmentation times. The proposed changes to the BFN Emergency Plan will continue to describe the authorities, responsibilities and duties of these individuals. Therefore, with the changes proposed in the LAR, the requirements of 10 CFR 50 Appendix E continue to be met.

NUREG-0654/FEMA-REP-1, Revision 1 (Reference 3)

NUREG-0654/FEMA-REP-1, Revision 1, Section II.B.5 states, in part:

*“Each licensee shall specify the positions or title and major tasks to be performed by the persons to be assigned to the functional areas of emergency activity. For emergency situations, specific assignments shall be made for all shifts and for plant staff members, both onsite and away from the site. These assignments shall cover the emergency functions in Table B-1 entitled, ‘Minimum Staffing Requirements for Nuclear Power Plant Emergencies.’ The minimum on-shift staffing levels shall be as indicated in Table B-1. The licensee must be able to augment on-shift capabilities within a short period after declaration of an emergency. This capability shall be as indicated in Table B-1.”*

NUREG-0654 Revision 1 states general guidance concerning the onsite emergency organization to allow licensees some flexibility in the number of on-shift staff required by emergency plans for response to emergency events. NUREG-0654 guidance recommends that there be, in addition to on-shift personnel, 30-minute and 60-minute responders. The augmented ERO responders assume many managerial, engineering, and administrative duties from the on-shift personnel, allowing them to focus more fully on plant operations. NUREG-0654 also provides the guidance that augmentation time be measured from the declaration of the emergency. The current BFN Emergency Plan staffing in Figure A-1 meets the intent of NUREG-0654, Table B-1. This LAR proposes to remove maintenance personnel from shift and extend the current staff augmentation response times in one case, from 30 minutes to 90 minutes and in remaining cases, extend 30 and 60-minute response times to 60 and 90 minutes. The proposed changes have been evaluated in a staffing analysis performed to meet 10 CFR 50 Appendix E.IV.A.9 requirements. The proposed changes to the BFN Emergency Plan continue to meet the intent of NUREG-0654, Rev 1, Table B-1 (i.e., continues to cover the emergency functional areas in Table B-1). This change is in alignment with NUREG-0654, Rev 1, Section II.B.5.

#### 4.2 Precedent

The proposed BFN Emergency Plan changes are similar to changes approved for other licensees, including Susquehanna (ML030830543), Fermi (ML102700478), River Bend (ML012710218), Watts Bar (ML041810056), Point Beach (ML16118A154), Duane Arnold (ML17220A026), Monticello (ML17349A91), Prairie Island (ML17362A202) and Sequoyah (ML18159A461). Of these precedents, the proposed BFN Emergency Plan changes are most closely aligned with the changes approved for Sequoyah Nuclear Plant. Furthermore, the proposed BFN Emergency Plan changes and evaluation documented in this submittal continue to meet the standards of 10 CFR 50.47(b) and the requirements of 10 CFR 50 Appendix E.

#### 4.3 No Significant Hazards Considerations Determination

In accordance with the requirements of 10 CFR 50.90, Tennessee Valley Authority (TVA) requests an amendment to facility Renewed Facility Operating Licenses DPR-33, DPR-52, and DPR-68 for the Browns Ferry Nuclear Plant (BFN) to revise the Emergency Plan. Completion of an on-shift staffing analysis of the Emergency Response Organization (ERO) supported the proposed changes to remove maintenance personnel from shift and extend the staff augmentation times in one case, from 30 minutes to 90 minutes and in remaining cases, extend 30 and 60-minute response times to 60 and 90 minutes as described. TVA proposes to revise the ERO staff augmentation response times in the BFN Emergency Plan.

TVA has evaluated the proposed amendment against the standards in 10 CFR 50.92 and has determined that the operation of the Browns Ferry Nuclear Plant in accordance with the proposed amendment presents no significant hazards. The TVA evaluation against each of the criteria in 10 CFR 50.92 follows.

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No.

The proposed increase in staff augmentation times has no effect on normal plant operation or on any accident initiator or precursors and does not impact the function of plant structures, systems, or components (SSCs). The proposed change does not alter or prevent the ability of the Emergency Response Organization to perform their intended functions to mitigate the consequences of an accident or event. The ability of the emergency response organization to respond adequately to radiological emergencies has been demonstrated as acceptable through a staffing analysis as required by 10 CFR 50 Appendix E.IV.A.9.

Therefore, the proposed Emergency Plan changes do not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No.

The proposed change does not impact the accident analysis. The change does not involve a physical alteration of the plant (i.e., no new or different type of equipment will be installed), a change in the method of plant operation, or new operator actions. The proposed change does not introduce failure modes that could result in a new accident, and the change does not alter assumptions made in the safety analysis. This

proposed change increases the staff augmentation response times in the Emergency Plan, which are demonstrated as acceptable through a staffing analysis as required by 10 CFR 50 Appendix E.IV.A.9. The proposed change does not alter or prevent the ability of the Emergency Response Organization to perform their intended functions to mitigate the consequences of an accident or event.

Therefore, the proposed change does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed change involve a significant reduction in a margin of safety?

Response: No.

Margin of safety is associated with confidence in the ability of the fission product barriers (i.e., fuel cladding, reactor coolant system pressure boundary, and containment structure) to limit the level of radiation dose to the public. The proposed change is associated with the Emergency Plan staffing and does not impact operation of the plant or its response to transients or accidents. The change does not affect the Technical Specifications. The proposed change does not involve a change in the method of plant operation, and no accident analyses will be affected by the proposed change. Safety analysis acceptance criteria are not affected by this proposed change. The revised Emergency Plan will continue to provide the necessary response staff with the proposed change. A staffing analysis and a functional analysis were performed for the proposed change on the timeliness of performing major tasks for the functional areas of Emergency Plan. The analysis concluded that an extension in staff augmentation times would not significantly affect the ability to perform the required Emergency Plan tasks. Therefore, the proposed change is determined to not adversely affect the ability to meet 10 CFR 50.54(q)(2), the requirements of 10 CFR 50 Appendix E, and the emergency planning standards as described in 10 CFR 50.47(b).

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

#### 4.4 Conclusion

Tennessee Valley Authority has evaluated the proposed change against the applicable regulatory requirements and acceptance criteria. The proposed BFN Emergency Plan changes continue to assure that regulatory requirements and emergency planning standards associated with emergency response are met.



Based on the above evaluation, TVA has determined that operation of the facility in accordance with the proposed change does not involve a significant hazards consideration as defined in 10 CFR 50.92(c), in that it does not: (1) involve a significant increase in the probability or consequences of an accident previously evaluated; (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

## **5.0 ENVIRONMENTAL CONSIDERATION**

TVA has determined that the proposed change would not revise a requirement with respect to installation or use of a facility or component located within the restricted area, as defined in 10 CFR 20, nor would it change an inspection or surveillance requirement. The proposed amendment does not involve (i) a significant hazards consideration, or (ii) authorize a significant change in the types or a significant increase in the amounts of any effluent that may be released Offsite, or (iii) result in a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for a categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, TVA concludes that pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment needs to be prepared in connection with the proposed amendment.

## **6.0 REFERENCES**

1. NRC Letter to TVA, "Office of Nuclear Power - Radiological Emergency Plan, Revision 0 Docket Nos. 50-259, 50-260, 50-296, 50-327, and 50-328," dated November 1, 1988 (8811090459)
2. NRC Letter to TVA, "Browns Ferry and Sequoyah Proposed Emergency Plan Changes," dated January 4, 1995 (9501110068)
3. NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," Revision 1, U.S. Nuclear Regulatory Commission and Federal Emergency Management Agency, November 1980
4. NSIR/DPR-ISG-01, "Interim Staff Guidance, Emergency Planning for Nuclear Power Plants," Revision 0, November 2011
5. NRC Inspection Manual, Inspection Procedure 71114.03, "Emergency Preparedness Organization Staffing and Augmentation System," October 1, 2016
6. NRC Letter to TVA, "Browns Ferry Nuclear Plant, Units 1, 2, and 3; Sequoyah Nuclear Plant, Units 1 and 2; Watts Bar Nuclear Plant, Units 1 and 2 - Issuance of Amendments Regarding Request to Upgrade Emergency Action Level Scheme (CAC Nos. MF9054, MF9055, MF9056, MF9057, MF9058, MF9059, and MF9060; EPID L-2017-LLA-0160)," dated December 22, 2017 (ML17289A032)

7. NRC Letter to TVA, "Browns Ferry Nuclear Plant, Units 1, 2 and 3, Issuance of Amendments Eliminating Requirements for Post-Accident Sampling (TAC Nos. MB7747, MB7748 and MB7749," dated May 9, 2003 (ML031290543)
8. NRC Letter to TVA, "Sequoyah Nuclear Plant, Units 1 and 2, Issuance of Amendments Regarding Request to Change Emergency Plan (EPID L-2017-LLA-0310)," dated August 6, 2018 (ML18159A461)

**Attachment 1**

**Proposed Emergency Plan Sections (Mark-up)**

**Sub-Attachments:**

**1-A) Proposed TVA Radiological Emergency Plan (REP) (Generic Part) (Mark-up)**

**1-B) Proposed TVA REP Appendix A, Browns Ferry Nuclear Plant (Mark-up)**

**Sub-Attachment 1-A**

**Proposed TVA Radiological Emergency Plan (REP) (Generic Part) (Mark-up)**

**(6 Pages Follow)**



**Radiological  
Emergency  
Procedure**

**RADIOLOGICAL EMERGENCY PLAN  
(GENERIC PART)**

**REP-Generic  
Rev. XXX0109  
Page 1 of 91**

Quality Related  Yes  No

Effective Date 02-01-2019

Level of Use: Information Use

Prepared by: [Josh Perrel](#)

Reviewed by: \_\_\_\_\_  
10 CFR 50.54(q) Reviewer Date

Reviewed by: \_\_\_\_\_  
Independent Qualified Reviewer Date

Reviewed by: \_\_\_\_\_  
Reviewer Date

Concurred by: \_\_\_\_\_  
EP Manager (BFN) Date

Concurred by: \_\_\_\_\_  
BFN PORC Chairman Date

Concurred by: \_\_\_\_\_  
EP Manager (SQN) Date

Concurred by: \_\_\_\_\_  
SQN PORC Chairman Date

Concurred by: \_\_\_\_\_  
EP Manager (WBN) Date

Concurred by: \_\_\_\_\_  
WBN PORC Chairman Date

Concurred by: \_\_\_\_\_  
Director, Emergency Preparedness Date

Approved by: \_\_\_\_\_  
VP, Nuclear Reg Affairs and Support Services Date

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3.2.1

**General Information (continued)**

- 2. Support personnel will be notified to report as required by the situation. Staffing time for the augmenting forces is indicated in the site-specific appendix.
- 3. This time could vary slightly, depending upon the time of day, weather conditions, immediate availability of personnel, and radiological conditions.
- E. The site emergency organization augments the shift operations crew.
  - 1. If members of the site emergency organization are not present when an emergency occurs, the Shift Manager on duty, or a designated Unit Supervisor when acting as the Shift Manager, is designated the Site Emergency Director and acts for him until relieved by the Plant Manager or his alternate.
- F. Upon detection of a known or suspected emergency, the Shift Manager on duty refers to the site-EPIP-1 to determine the classification of the emergency.
  - 1. After determining the classification of the incident, the Shift Manager assumes the responsibilities of Site Emergency Director and initiates the appropriate procedure referenced by site-EPIP-1.
  - 2. Staffing instructions for the site emergency support centers are specified in the site-EIPs.
- G. Site procedures shall designate site personnel who shall staff the ENS and HPN (NRC FTS 2000 System) Communication Systems.
  - 1. Site procedures shall designate the interface during TSC operation.
- H. Each site will at a minimum establish the following positions within its emergency response organization with corresponding responsibilities as outlined below. The site-specific appendix gives detailed staffing and organizational data, including additional positions deemed necessary by the site.

**3.2.2 Site Vice President (Watts Bar and Browns Ferry Only)**

- A. The Site Vice President serves as a corporate interface for the SED, relieving him from duties which could distract from the SED's primary purpose of plant operations and accident mitigation activities. The Site Vice President provides assistance to the SED by providing TVA policy direction; directing site resources to support the SED in accident mitigation activities; and providing a direct interface on overall site response activities with NRC, DHS, or other Federal organizations responding to the site, CECC Director, or onsite media.
- B. At his discretion, he may provide an interface at the appropriate offsite location on the overall site response activities with State and local agencies, NRC region/corporate, or Joint Information Center. He also provides support to other emergency operation centers as necessary.

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**Alert (continued)**

- B. The purposes of the Alert class are:
1. To ensure that emergency personnel are readily available to respond if the situation becomes more serious or to perform confirmatory radiation monitoring, if required; and
  2. To provide offsite authorities current status information.
  3. To ensure that monitoring teams are dispatched (Sequoyah and Browns Ferry only).
- C. The Alert class is maintained until event termination or escalation to a higher class. The State authorities are notified and in turn notify the local authorities. Following closeout, State authorities are briefed and no later than the next working day a written summary of significant events which occurred is forwarded to the State.

**4.1.4 Site Area Emergency**

- A. A Site Area Emergency is declared when events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or Hostile Action that results in intentional damage or malicious acts (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.
- B. The purposes of the Site Area Emergency class are:
1. To ensure that response centers are activated.
  2. To assure that monitoring teams are dispatched.
  3. To assure that personnel required for evacuation of nearsite areas are at duty stations if the situation becomes more serious.
  4. To provide current information for, and consultation with, offsite authorities and the public.
- C. The Site Area Emergency class is maintained until event termination or escalation to a higher class. The State authorities are notified and in turn notify the local authorities. Following closeout, State authorities are briefed and no later than the next working day a written summary of significant events which occurred is forwarded to the State.

**4.1.5 General Emergency**

- A. A General Emergency is declared when events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or Hostile Action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more that the immediate site area.
- B. The purposes of the General Emergency class are:

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## 5.1 Onsite

Upon detection of a known or suspected emergency, the Shift Manager on duty will utilize the site-EPIP-1 to determine the classification of the emergency. After determining the classification of the emergency, the SED will initiate the appropriate procedures referenced by the site-EPIP-1. Each procedure referenced by site-EPIP-1 gives specific instructions on staffing the TSC and OSC and for notifying the State, ODS, and NRC.

## 5.2 Offsite

Implementing procedures are provided to activate TVA and State emergency staffs. Essential emergency positions are covered on a 24-hour-a-day basis by duty personnel. Emergency centers are located to ensure rapid and effective response of personnel needed to assess and evaluate offsite conditions.

### 5.2.1 Notification of Unusual Event (NOUE)

Upon declaration of this class, the following actions are performed:

- A. The MCR notifies and relays the information to the State within 15 minutes of declaration of the event.
- B. The ODS in Chattanooga is notified of the event by the MCR and records the details of the event in accordance with the appropriate EPIP.
- C. The ODS notifies and relays the information to the EDO and CECC Director.
- D. The EDO keeps the CECC Director and the Public Information Manager informed of the situation as necessary.
- E. The PIM notifies the Site Communications Consultant; Director, Public Relations & Corporate Information; and TVA News Bureau (Knoxville).
- F. The SED augments plant shift personnel as necessary to initiate corrective or protective actions.

### 5.2.2 Alert

Upon declaration of this class, the following minimum actions are performed:

- A. Notifications described in Section 5.2.1 are performed.
- B. The CECC is activated.
- C. Environmental sampling teams are dispatched for Sequoyah and Browns Ferry and may be dispatched at this classification level for ~~Browns Ferry and~~ Watts Bar.
- D. The TSC and the OSC are activated.
- E. The situation is analyzed and any appropriate corrective or preventive actions initiated.
- F. Hourly, or more often as necessary, the State agencies are updated through the CECC on appropriate plant status and environmental conditions as follows:



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9.2.1

**General Information (continued)**

This procedure is designed to direct the activities of the Meteorologist during a radiological emergency to provide a timely response, consistent and accurate meteorological information, and atmospheric transport and dispersion advice.

R. CECC-EPIP-18-TRANSPORTATION AND STAFFING UNDER ABNORMAL CONDITIONS

This procedure provides instructions for the transportation of TVA employees under certain limited circumstances. It also includes instructions for lodging and meals as necessary under those circumstances.

S. CECC-EPIP-19- POST ACCIDENT FUEL DAMAGE ASSESSMENT

This procedure provides a method to assess the degree of reactor core damage from measured fission product concentrations and interpretations of other plant parametric data under accident conditions. The procedure also provides guidance in obtaining necessary information to predict radionuclide releases (source term) from TVA nuclear plants during accident conditions.

T. CECC-EPIP-20- NOT ACTIVE AT THIS TIME

U. CECC-EPIP-21- EMERGENCY DUTY OFFICER PROCEDURE FOR NOTIFICATION OF UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, AND GENERAL EMERGENCY

This procedure is designed to direct the EDO in notifying key TVA organizations and contacts in the event of a Notification of Unusual Event, Alert, Site Area Emergency, or General Emergency.

V. CECC-EPIP-22- OPERATIONS DUTY SPECIALIST TRANSPORTATION INCIDENTS INVOLVING A SHIPMENT OF RADIOACTIVE MATERIAL

This procedure directs the ODS in obtaining information concerning a transportation accident involving radioactive material.

W. CECC-EPIP-23- RADIOACTIVE MATERIAL TRANSPORTATION INCIDENTS

The objective of this procedure is to provide guidance and instructions to emergency personnel concerning transportation accidents involving radioactive materials.

**9.2.2 Sampling Team**

TVA has vans equipped to monitor the environment for radioactivity. Each site van has an air sampler, radiation measurement equipment, a generator, radio, and other assorted equipment. A detailed listing of the minimum required equipment is available in the CECC-EPIPs.

A. These vehicles are dispatched for environmental monitoring for Site Area Emergency and General Emergency classifications for Browns Ferry and Watts Bar and at the Alert or higher classification for Browns Ferry and Sequoyah.

B. They may be deployed for lower classifications, if warranted.

<b>Radiological Emergency Procedure</b>	<b>RADIOLOGICAL EMERGENCY PLAN (GENERIC PART)</b>	<b>REP-Generic Rev. XXX0409 Page 51 of 91</b>
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9.2.2

**Sampling Team (continued)**

- C. Van(s) are stationed at each site.
- D. Each team has the capability to:
  - 1. Obtain environmental samples for analysis.
  - 2. Make direct radiation readings.
  - 3. Collect air samples and analyze them for gross beta-gamma radioactivity over a range of energies.
  - 4. Collect air samples and analyze them for radioiodine in the field, to concentrations as low as  $10^{-7}$  microcuries/cc.
- E. Within 30 minutes (60 minutes for **BFN and SQN**) of the applicable emergency declaration, one sampling team can be deployed from the plant for environmental assessment. Additional teams can be dispatched from other facilities. At least one additional team can be deployed within approximately one hour (90 minutes for **BFN and SQN**) of notification. Composition and activation of sampling teams are described in the EIPs.
- F. For the Site Area Emergency, and General Emergency classifications, teams are dispatched from the nearest location.
- G. They may be deployed for the Notification of Unusual Event or Alert, as noted in 9.2.2B, if warranted. If necessary, teams can be transported in a helicopter or fixed-wing aircraft.
- H. The TSC Rad Protection Manager or CECC Environs Assessor can request assistance from a neighboring plant for environmental monitoring, if deemed necessary.
- I. TVA has aquatic monitoring teams located at Chattanooga, Tennessee and Athens, Alabama. These teams have boats that can be deployed to obtain samples from the river for subsequent analysis for radioactivity in the laboratories.
- J. State agencies have the responsibility to coordinate and evaluate offsite assessment actions. All environmental monitoring activities will be coordinated through the RMCC. State environmental monitoring capabilities and the RMCC operations are referenced in Appendix E. TVA will be co-located in the RMCC and coordination of TVA and State monitoring teams will be conducted from that point. Environmental monitoring data will be shared between the State and TVA.
- K. Additional environmental monitoring assistance can be obtained by contacting the DOE offices at Oak Ridge, Tennessee or Aiken, South Carolina. The EPA in Montgomery, Alabama can also provide assistance. Environmental monitoring teams and mobile radioanalytical laboratories can be supplied. The State agencies usually request and coordinate these services.

**Sub-Attachment 1-B**

**Proposed TVA REP Appendix A, Browns Ferry Nuclear Plant (Mark-up)**

**(14 Pages Follow)**



**Radiological  
Emergency  
Procedure**

**BROWNS FERRY NUCLEAR PLANT  
RADIOLOGICAL EMERGENCY PLAN**

**REP-Appendix A  
Rev. XXX  
Page 1 of 29**

Quality Related  Yes  No

PORC Required  Yes  No

Effective Date \_\_\_\_\_

Level of Use: Information Use

Prepared by: \_\_\_\_\_

Reviewed by: \_\_\_\_\_  
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BFN EP Manager Date

Concurred by: \_\_\_\_\_  
BFN PORC Chair Date

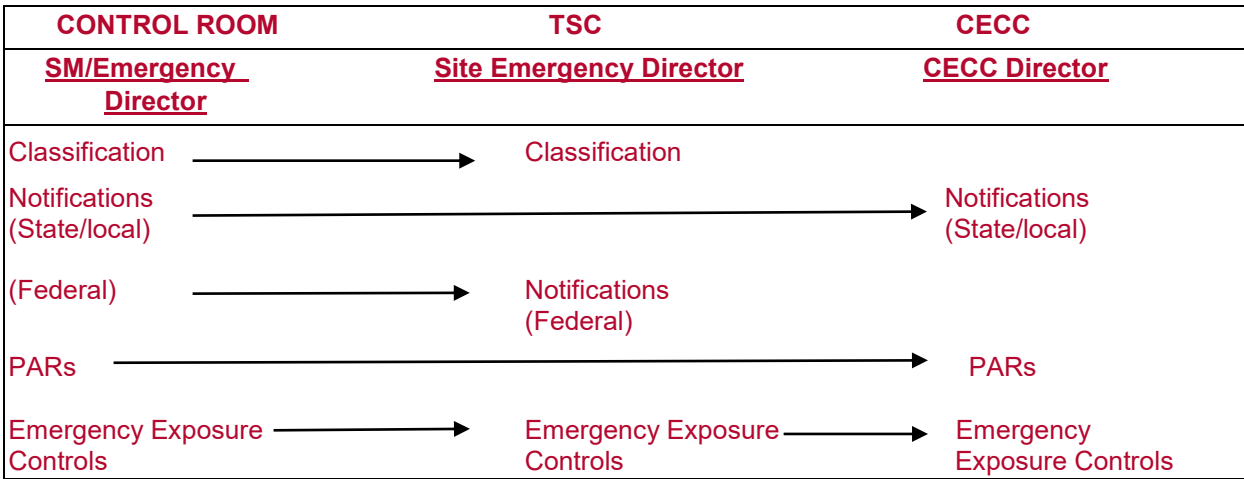
Concurred by: \_\_\_\_\_  
Director, Emergency Preparedness Date

Approved by: \_\_\_\_\_  
VP, Nuclear Regulatory Affairs and Support Services Date

**3.0 SITE EMERGENCY ORGANIZATION**

BFN maintains an organization capable of responding to a radiological emergency. The TSC and OSC and Control Room staffing for response to emergencies is shown in Figures A-1. Figure A-1 also identifies minimum staff positions (MASP) required to activate the TSC and OSC. Facility activation will be completed within 60 minutes of an Alert or higher classification. The minimum on-shift emergency response staffing is shown in Figure and A-2. The typical Command and Control transfer process is outlined in the diagram below. The TSC retains the capability to perform all command and control functions should the CECC be unavailable for any reason.

**Typical Transition of Command and Control Functions**



**3.1 Site Vice President**

The Site Vice President serves as a corporate interface for the SED, relieving him from duties which could distract from the SED's primary purpose of plant operations and accident mitigation activities. The Site Vice President shall provide assistance in the following areas as needed:

- A. Provides TVA policy direction to the Site Emergency Director.
- B. Directs the site resources to support the Site Emergency Director in the accident mitigation activities.
- C. Provides direct interface on overall site response activities with:
  - 1. NRC, FEMA, or other Federal organizations responding to the site.
  - 2. CECC Director.
  - 3. Onsite media.
- D. At his discretion, may provide interface at the appropriate offsite location on the overall site response activities with:
  - 1. State and local agencies.

Radiological Emergency Procedure	BROWNS FERRY NUCLEAR PLANT RADIOLOGICAL EMERGENCY PLAN	REP-Appendix A Rev. <b>XXX</b> Page 8 of 29
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~~2.— NRC region/corporate.~~

~~3.— Joint Information Center.~~

~~4.— Provides support to other emergency operation centers as necessary.~~

### **3-23.1 Site Emergency Director**

- A. Directs onsite emergency accident mitigation activities.
- B. Consults with CECC Director ~~and Site Vice President~~ on significant events and their related impacts.
- C. Initiates onsite protective actions.
- D. Coordinates accident mitigation actions with NRC.
- E. Initiates long-term 24-hour accident mitigation operations.
- F. ~~Prior to the CECC being staffed, makes recommendations for protective actions (if necessary) to State and local agencies. This responsibility cannot be delegated except to the CECC Director after the CECC is operational.~~
- G. Responsible for determining the emergency classification. This responsibility cannot be delegated.
- H. Makes final decision on personnel entrance to radiological hazardous areas when RP recommends against the entry.
- I. Approves emergency exposures when required, this cannot be delegated.

### **3-33.2 Operations Manager**

- A. Directs operational activities.
- ~~B.— Informs Site Emergency Director of plant status and operational problems.~~
- B. Performs damage assessment as necessary.
- C. Recommends solutions and mitigating action for operational problems.

### **3-43.3 Technical Assessment Manager**

- A. Directs onsite effluent assessment.
- B. Directs activities of technical assessment team.
- C. Projects future plant status based on present plant conditions.
- D. Keeps assessment team informed of plant status.
- E. Provides information, evaluations, and projects to Site Emergency Director.

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- F. Coordinates assessment activities with the CECC plant assessment team.
- G. Ensures that Plant Status Boards are maintained.

#### **3-53.4 Maintenance Manager**

- A. Directs repairs and corrective actions.
- B. Performs damage assessment.
- C. Directs activities of Operations Support Center.

#### **3.6 TSC Clerks**

- ~~A. Maintain log of events.~~
- ~~B. Answer telephones.~~
- ~~C. Operate facsimile machine.~~
- ~~D. Other duties as assigned by Site Emergency Director.~~

#### **3.7 TSC Communicator**

- ~~A. Provides information from control room to Technical Assessment team as needed.~~
- ~~B. Completes plant data sheets as needed.~~

#### **3-83.5 Nuclear Security Manager**

- A. Directs activities of Nuclear Security Services personnel.
- B. Controls access to site and control rooms.
- C. Reports on site accountability/evacuation as defined in BFN-EIPs.

#### **3-93.6 Radiation Protection (RP) Manager**

- A. Directs and/or performs assessment of inplant and onsite radiological conditions.
- B. Directs onsite RP activities.
- C. Coordinates additional RP support with CECC Radiological Assessment Manager.
- D. Makes recommendations for protective actions for onsite personnel.
- E. Maintains status map of offsite radiological conditions.
- F. Coordinates assessment of radiological conditions offsite with CECC Radiological Assessment Manager.
- G. Maintains inplant radiation status board.

<b>Radiological Emergency Procedure</b>	<b>BROWNS FERRY NUCLEAR PLANT RADIOLOGICAL EMERGENCY PLAN</b>	<b>REP-Appendix A Rev. XXX Page 11 of 29</b>
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### 3-163.13 NRC Coordinator

- A. Acts as primary liaison with onsite NRC personnel.
- B. Updates NRC personnel on plant status.
- C. Provides information requests from NRC to TSC personnel.

### 3-173.14 Operations Communicator

- A. Provides operational knowledge for status evaluation of plant systems.
- B. Provides advice regarding technical specifications, system response, safety limits, etc.
- C. Assists in development of recommended solutions to developing problems.
- ~~C~~.D. Provides support performance of Federal Notification function.

### ~~3-18~~ ~~Emergency Preparedness Manager~~

- ~~A. Advises Site Emergency Director regarding overall radiological emergency plan, use of implementing procedures, emergency equipment availability, and coordination with CECC.~~
- ~~B. Confirms site emergency centers are operating properly.~~

### 3-193.15 TAT Mechanical

- A. Serves as the primary interface with Engineering.
- B. Provides for additional engineering support during and/or following a radiological emergency.
- C. Coordinates the design and construction of emergency equipment and structures as necessary.

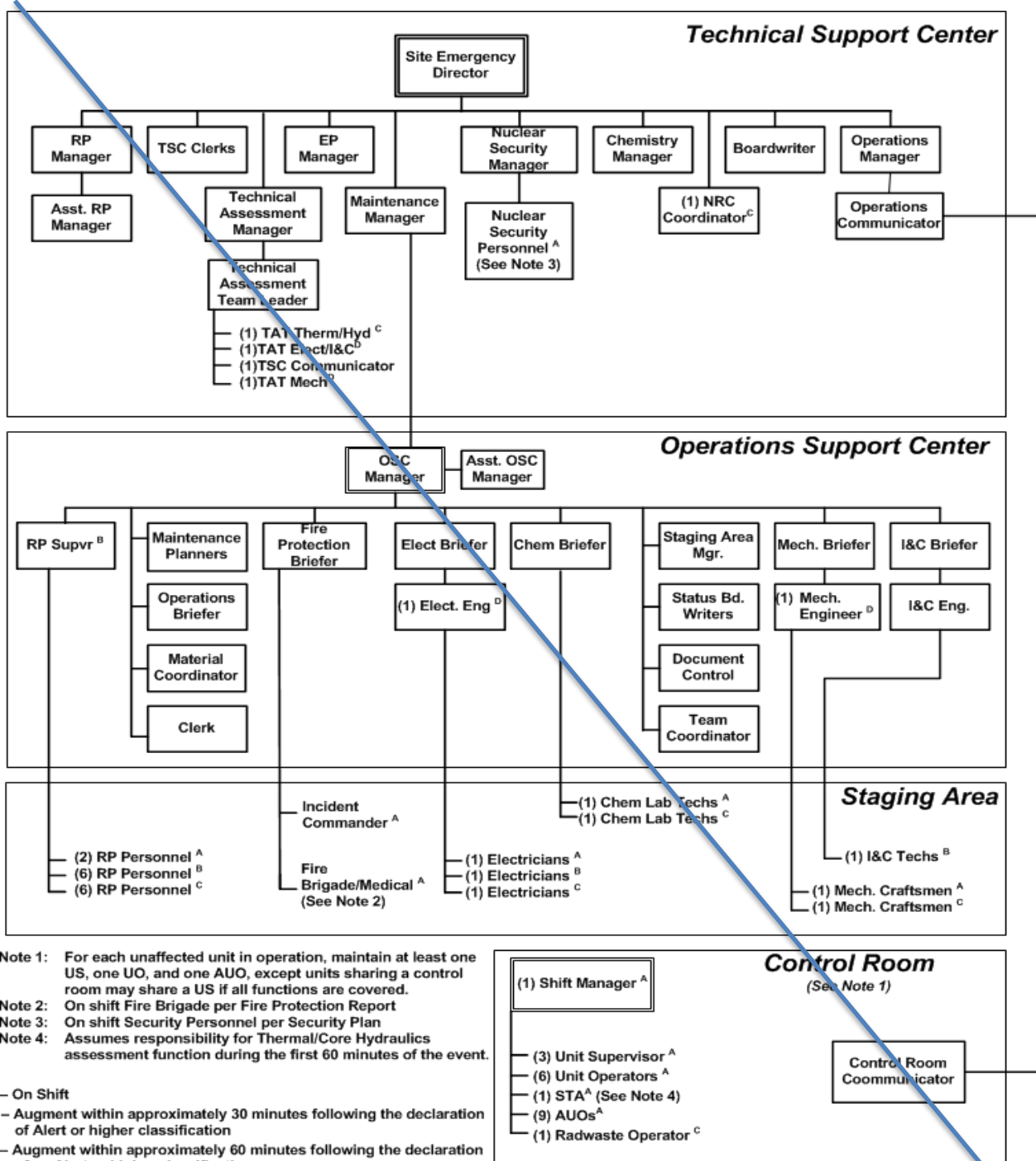
### 3-203.16 Technical Assessment Team

- A. Prepares and provides periodic current assessments on plant conditions and provides this information to the CECC plant assessment team.
- B. Projects future plant status based on present plant conditions.
- C. Provides technical support to plant Operations on mitigating actions.



**3-213.17 Emergency Response Organization Staffing**

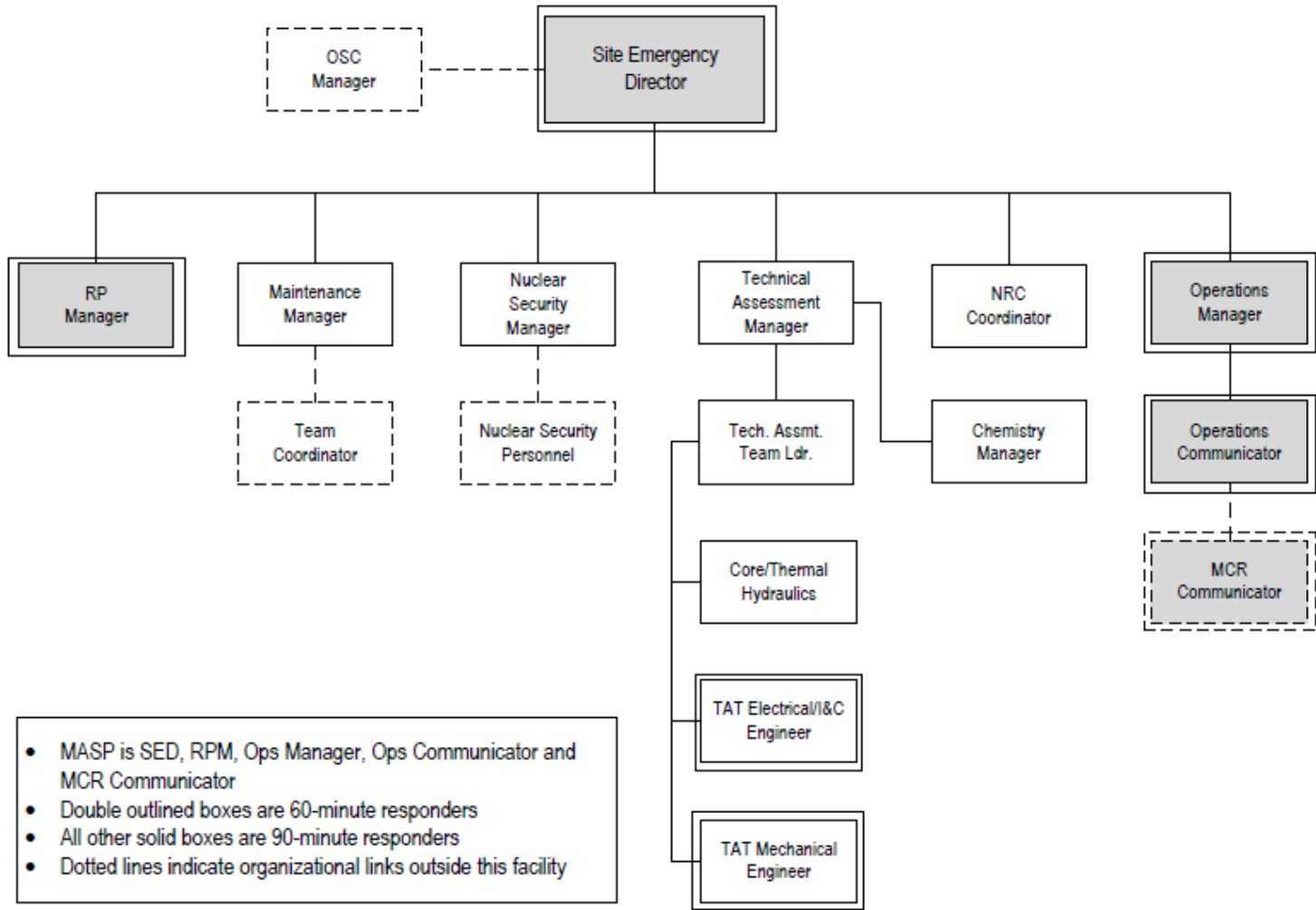
**FIGURE A-1**  
**SITE EMERGENCY ORGANIZATION**  
(Including Minimum Staffing and Staff Augmentation)



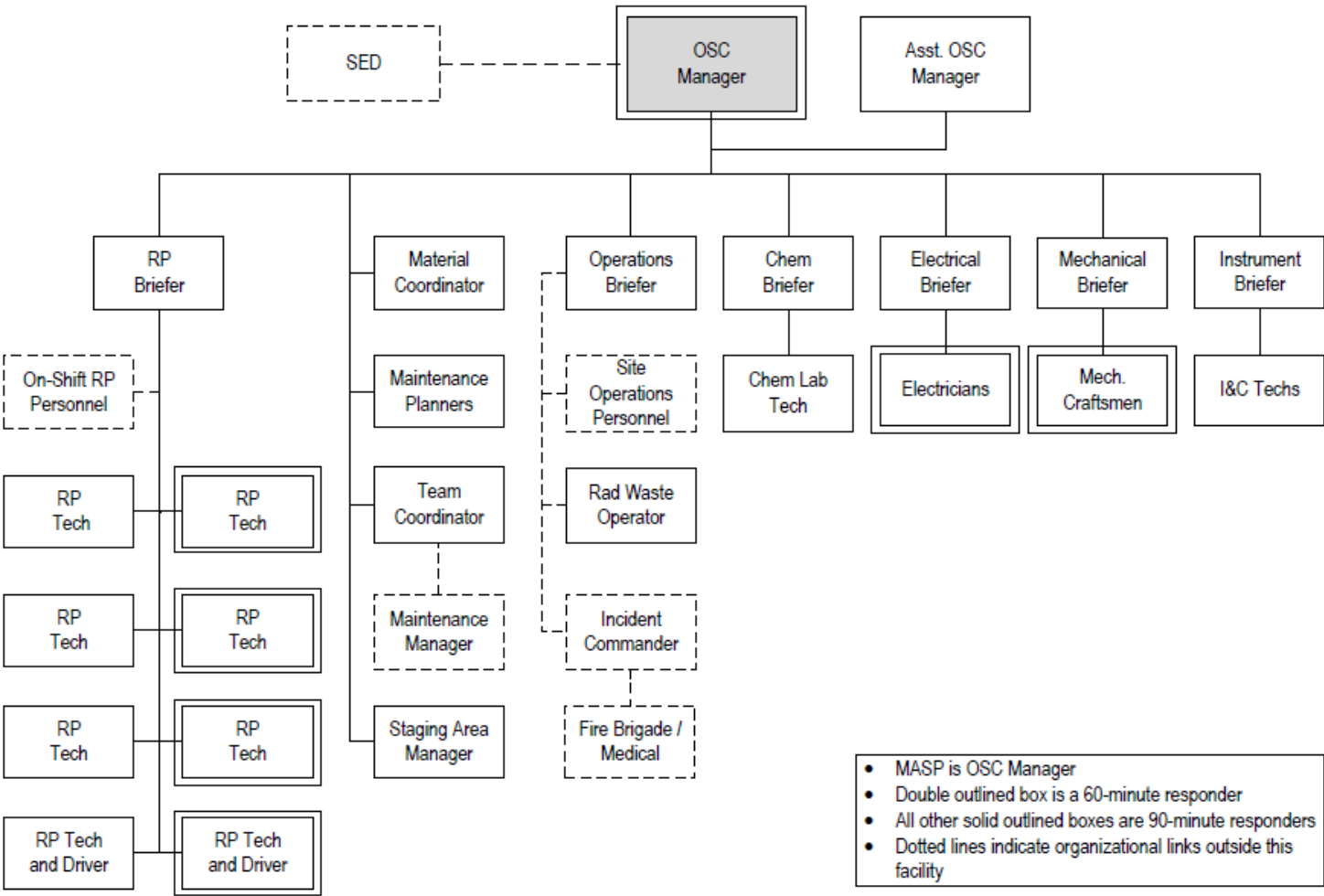
Note 1: For each unaffected unit in operation, maintain at least one US, one UO, and one AUO, except units sharing a control room may share a US if all functions are covered.  
Note 2: On shift Fire Brigade per Fire Protection Report  
Note 3: On shift Security Personnel per Security Plan  
Note 4: Assumes responsibility for Thermal/Core Hydraulics assessment function during the first 60 minutes of the event.

- <sup>A</sup> – On Shift
- <sup>B</sup> – Augment within approximately 30 minutes following the declaration of Alert or higher classification
- <sup>C</sup> – Augment within approximately 60 minutes following the declaration of an Alert or higher classification
- <sup>D</sup> – One Mechanical and one Electrical Engineer augmented within approximately 60 minutes. Function can be filled as applicable by either TSC or OSC position.

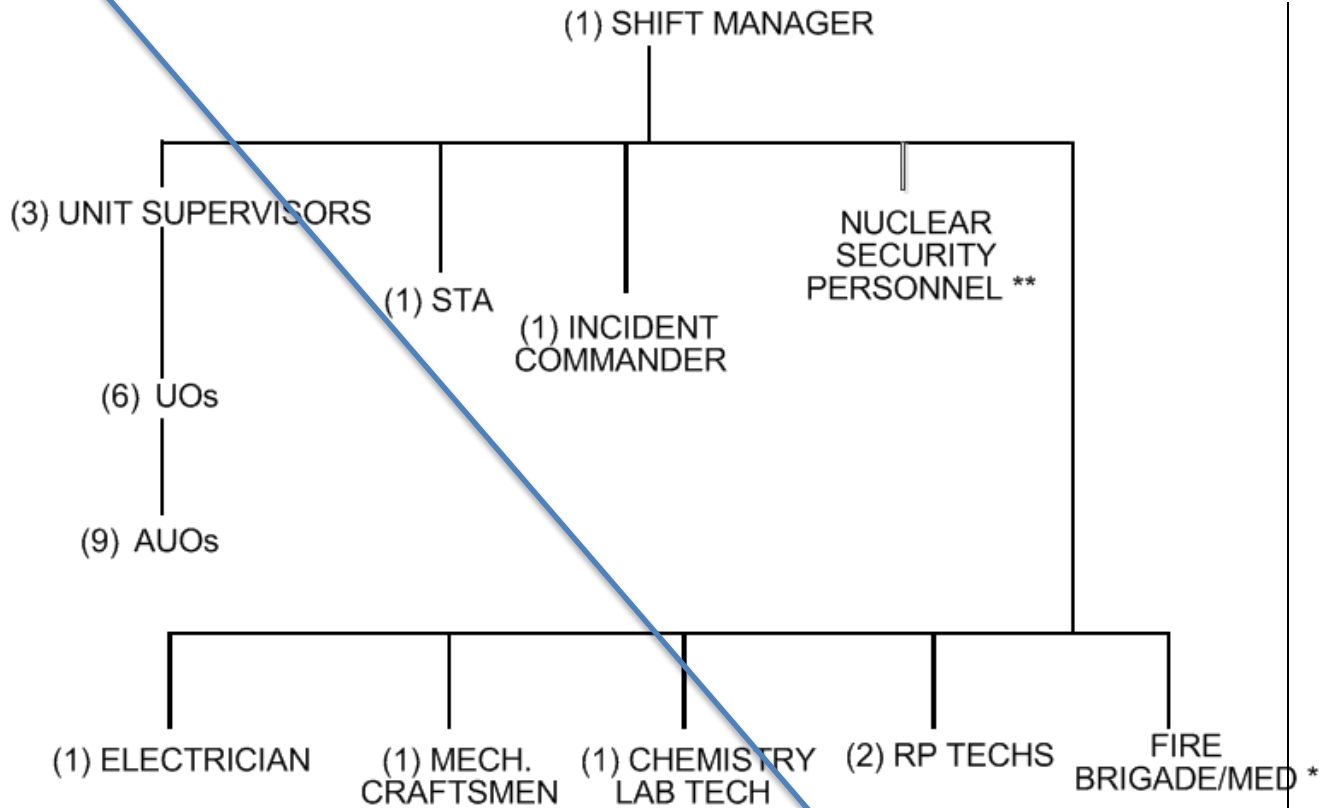
**Figure A-1  
TSC EMERGENCY ORGANIZATION  
(including minimum staffing and augmentation)**



**Figure A-1 (continued)**  
**OSC EMERGENCY ORGANIZATION**  
**(including minimum staffing and augmentation)**



**FIGURE A-2  
MINIMUM SHIFT RESPONSE PERSONNEL**



\* On shift Fire Brigade per Fire Protection Report

\*\* On shift Security Personnel per Security Plan

On-shift staffing is based on EP Rulemaking On-shift Staffing Analysis

**Figure A-2  
MINIMUM EMERGENCY RESPONSE STAFFING**

Major Functional Area	Major Tasks	Position Title or Expertise	On-Shift	Augmented Response		
				60 min	90 min	
Plant Operations and Shift Supervisor (SRO): Assessment of Control Room Reactor Operational Aspects		Shift Manager/ED (SRO)	1	---	---	
		Unit Supervisors (SRO)	3	---	---	
		Unit Operators (UO)	6	---	---	
		Auxiliary Unit Operators (AUO)	9	---	---	
Notification/ Communication	Notify State, local and Federal personnel & maintain communication	Emergency Communicator (Shift)	1**	---	---	
		MCR Communicator (CR)	---	1	---	
		Ops Manager (TSC)	---	1	---	
		Ops Communicator (TSC)	---	1	---	
		State Communicator (CECC)	---	1	---	
		EDO (CECC)	---	1	---	
Radiological Accident Assessment and Support of Operational Accident Assessment	Emergency Operations Facility Director	SED (TSC)	---	1	---	
		CECC Director	---	1	---	
		Plant Assmt Manager (CECC)	---	1	---	
	Offsite Dose Assessment		Chemistry Technician	1**	---	---
			RP Manager (TSC)	---	1	---
			RAM/RAC (CECC)	---	1	---
			Dose Assessor (CECC)	---	1	---
	Offsite Surveys		RP Tech / Support	---	2	2
	Onsite Surveys (out-of-plant) and In-Plant Surveys		RP Tech	2	1	1
	Chemistry/ Radio Chemistry		Chemistry Technician	1	---	1
Plant System Engineering	Technical Support	Shift Technical Advisor (SRO)	1	---	---	
		Tech Assmt Manager (TSC)	---	---	1	
		Tech Assmt Team Lead (TSC)	---	---	1	
		Core Damage Assessor (CECC)	---	1	---	

Major Functional Area	Major Tasks	Position Title or Expertise	On-Shift	Augmented Response	
				60 min	90 min
Plant System Engineering (continued)	Technical Support	Core/Thermal Hydraulics (TSC)	---	---	1
		Electrical Engineer (TSC)	---	1	---
		Mechanical Engineer (TSC)	---	1	---
Repair and Corrective Actions	Repairs and Corrective Actions	Mechanical Maintenance	---	1	---
		Electrical Maintenance	---	1	---
		Instrument Control	---	---	1
		OSC Manager	---	1	---
Protective Actions (In-Plant)	Radiation Protection: a. Access Control b. HP Coverage for repair, corrective actions, search and rescue, first-aid & firefighting c. Personnel monitoring d. Dosimetry	RP Tech	1	2	2
Fire Fighting		Fire Brigade (FPDP-1)	5	Local Support	Local Support
Rescue Operations and First Aid		Incident Commander (SRO)	1	Local Support	Local Support
		Other Site personnel	2**		
Site Access Control And Personnel Accountability	Security, firefighting communications personnel accountability	Security Personnel	Per Security Plan		
<b>TOTAL</b>			<b>30</b>	<b>22</b>	<b>10</b>

\*\* May be provided by shift personnel assigned other functions

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#### **4.0 EMERGENCY RESPONSE FACILITIES, EQUIPMENT, AND SUPPLIES**

Specific plant areas, facilities, and equipment are selected and provided for use during a radiological emergency. The preselection, allocation, and inclusion of emergency facilities assure that needed services and equipment are available for use during emergency conditions.

#### **4.1 Technical Support Center (TSC)**

A specific area (between units 1 and 2 control room and unit 3 control room) in the control bay at elevation 617.0' is designated for use as the TSC. The room is provided with communication facilities for plant areas and areas external to the plant. The communication facilities include TVA telephone system (with Bell System access, TVA Microwave System access, and long distance access), a paging-intercom system, and two-way radio capabilities. This room is sufficiently shielded to ensure occupancy during an emergency and is designed to be continuously habitable during all radiological emergencies. All ventilating and air-conditioning facilities have redundant or backup systems. Toilet facilities are available on the same elevation.

The diesel generators will provide emergency power when there is a loss of normal ac power, and cooling water for the air-conditioning equipment can be taken from the emergency equipment cooling water system. Emergency equipment is specially designated and stored near the TSC for use during an emergency. Figure A-3 shows a detailed TSC layout.

Meteorological information is available both in the TSC and main control room and includes wind speed and direction at 10, 46, and 91 meters, and temperature at 10, 46, and 91 meters.

TSC emergency response positions are described in BFN EPIP-6, "Activation and Operation of the Technical Support Center". Figure A-1 identifies minimum staff positions required to activate the TSC. Facility activation will be completed within 60 minutes of an Alert or higher classification.

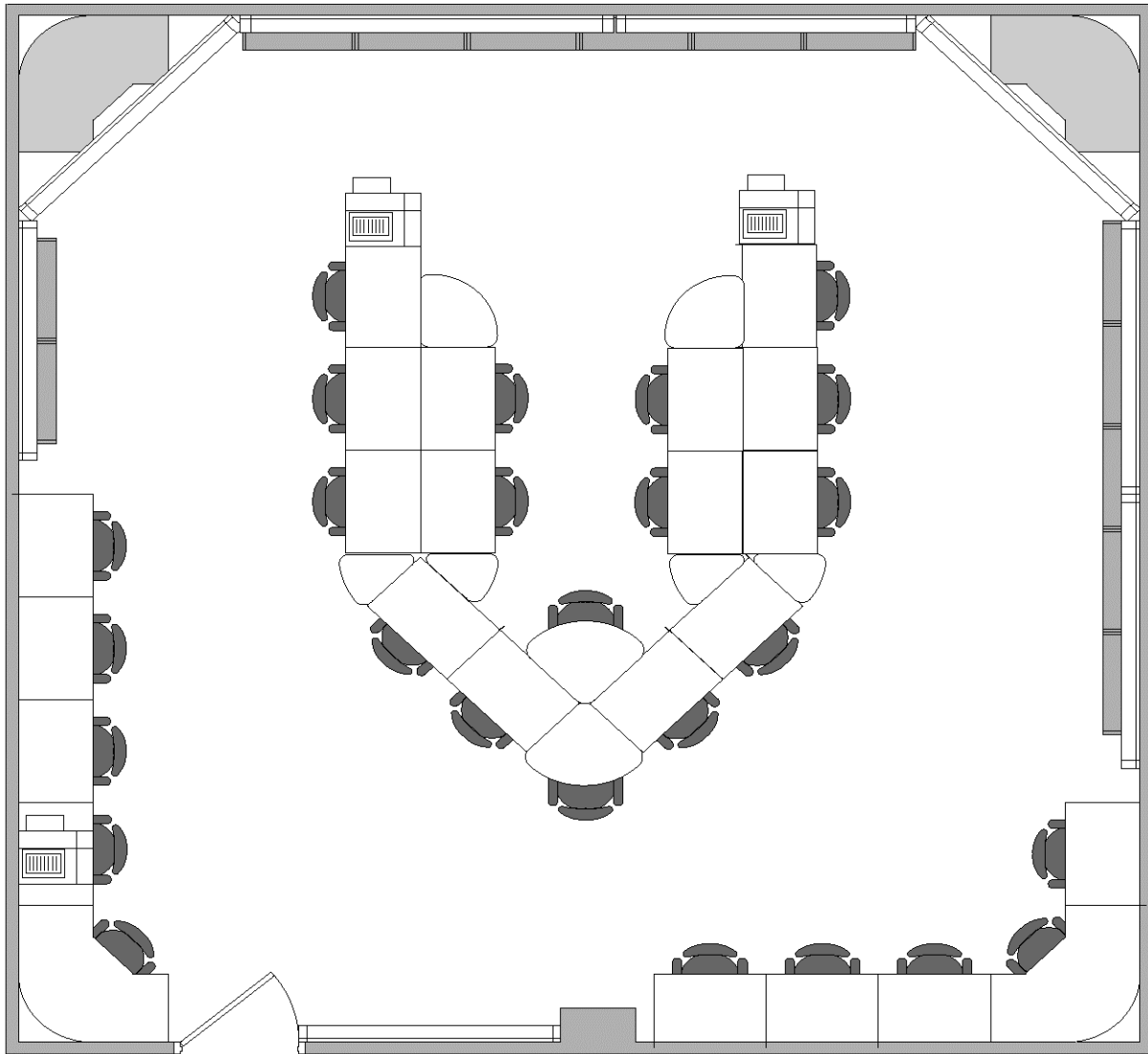
#### **4.2 Operations Support Center (OSC)**

The role of the OSC is to provide an assembly area for operations support personnel during an emergency situation and is under the supervision of the OSC Manager. The Plant Operations Support Center at elevation 586' in the service building (see Figure A-4) is designated for use as the OSC. The OSC is provided with telephone communications. In the event that radiation conditions require evacuation of this area, OSC personnel will report to the office building, elevation 586'.

OSC emergency response positions are described in BFN EPIP-7, "Activation and Operation of the Operations Support Center." Figure A-1 identifies minimum staff positions required to activate the OSC. Facility activation will be completed within 60 minutes of an Alert or higher classification.

4.5 Facility Figures

FIGURE A-3  
TECHNICAL SUPPORT CENTER (SAMPLE)

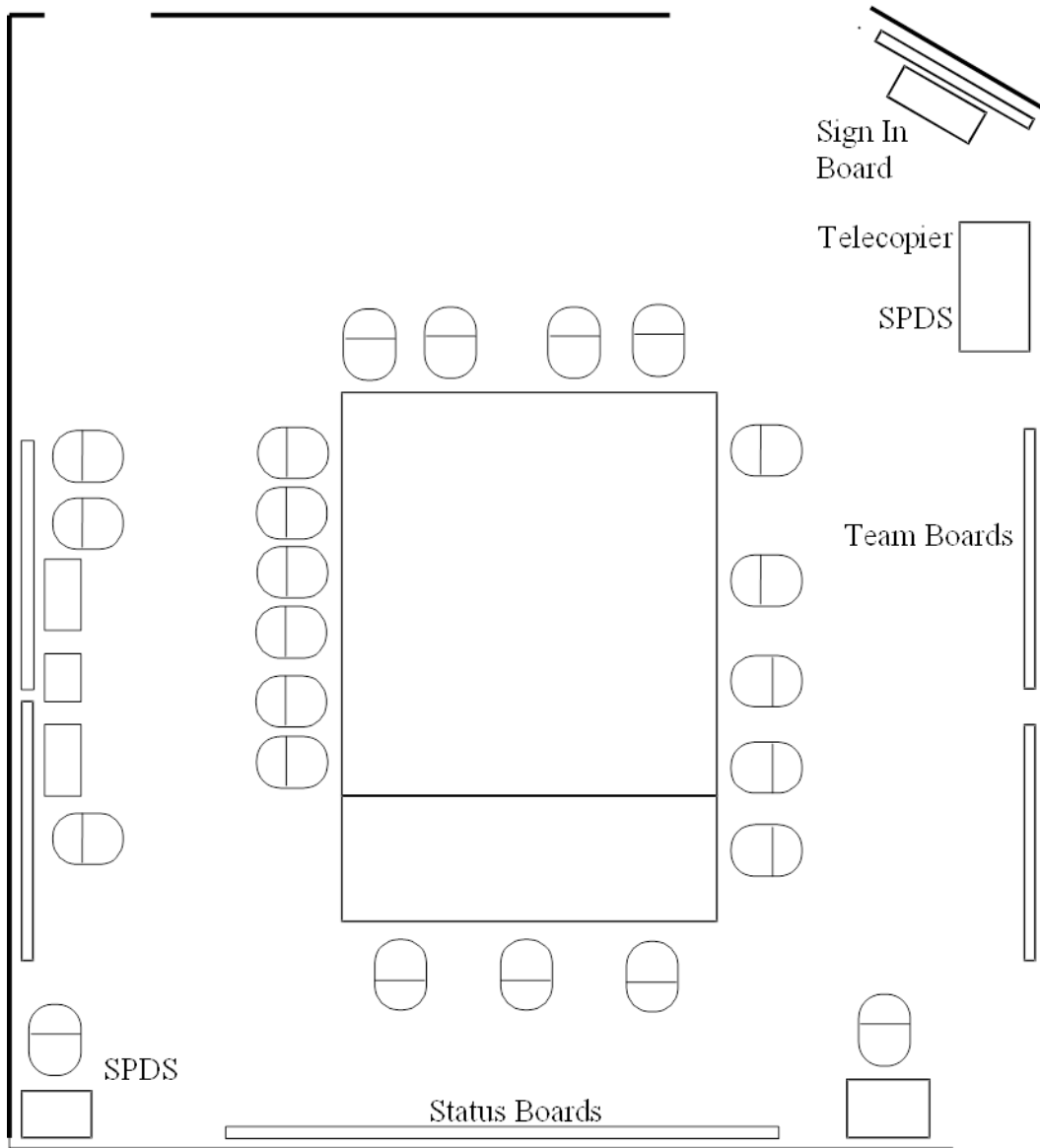


Technical Support Center assignments:

Site Emergency Director	Maintenance Manager	Tech. Assessment Manager	TSC Clerk
Site VP	Chemistry Manager	Nuclear Security Mgr.	
EP Manager	Assistant RP Manager	NRG Coord.	
RP Manager	OPS. Manager	OPS Communicator	



FIGURE A-4  
OPERATIONS SUPPORT CENTER (SAMPLE)



**Operations Support Center assignments:**

Assistant OSC- Mgr.	Document Control	OPS Briefer	OSC Manager	Team Coordr.
Chemistry	Fire Protection- Briefer	OSC Engineers	Planners	
Clerk	Material- Coordinator	OSC Maintenance- Briefers	RP	

**Attachment 2**

**Proposed Emergency Plan Sections (Retyped)**

**Sub-Attachments:**

**2-A) Proposed TVA Radiological Emergency Plan (REP) (Generic Part) (Retyped)**

**2-B) Proposed TVA REP Appendix A, Browns Ferry Nuclear Plant (Retyped)**

**Sub-Attachment 2-A**

**Proposed TVA Radiological Emergency Plan (REP) (Generic Part) (Retyped)**

**(6 Pages Follow)**



**RADIOLOGICAL EMERGENCY PLAN  
(GENERIC PART)**

**REP-Generic  
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**Radiological  
Emergency  
Procedure**

Quality Related       Yes       No

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Independent Qualified Reviewer      Date

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Reviewer      Date

Concurred by: \_\_\_\_\_  
EP Manager (BFN)      Date

Concurred by: \_\_\_\_\_  
BFN PORC Chairman      Date

Concurred by: \_\_\_\_\_  
EP Manager (SQN)      Date

Concurred by: \_\_\_\_\_  
SQN PORC Chairman      Date

Concurred by: \_\_\_\_\_  
EP Manager (WBN)      Date

Concurred by: \_\_\_\_\_  
WBN PORC Chairman      Date

Concurred by: \_\_\_\_\_  
Director, Emergency Preparedness      Date

Approved by: \_\_\_\_\_  
VP, Nuclear Reg Affairs and Support Services      Date

<b>Radiological Emergency Procedure</b>	<b>RADIOLOGICAL EMERGENCY PLAN (GENERIC PART)</b>	<b>REP-Generic Rev. XXX Page 19 of 91</b>
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### 3.2.1 (cont.)

### General Information (continued)

2. Support personnel will be notified to report as required by the situation. Staffing time for the augmenting forces is indicated in the site-specific appendix.
  3. This time could vary slightly, depending upon the time of day, weather conditions, immediate availability of personnel, and radiological conditions.
- E. The site emergency organization augments the shift operations crew.
1. If members of the site emergency organization are not present when an emergency occurs, the Shift Manager on duty, or a designated Unit Supervisor when acting as the Shift Manager, is designated the Site Emergency Director and acts for him until relieved by the Plant Manager or his alternate.
- F. Upon detection of a known or suspected emergency, the Shift Manager on duty refers to the site-EPIP-1 to determine the classification of the emergency.
1. After determining the classification of the incident, the Shift Manager assumes the responsibilities of Site Emergency Director and initiates the appropriate procedure referenced by site-EPIP-1.
  2. Staffing instructions for the site emergency support centers are specified in the site-EPIPs.
- G. Site procedures shall designate site personnel who shall staff the ENS and HPN (NRC FTS 2000 System) Communication Systems.
1. Site procedures shall designate the interface during TSC operation.
- H. Each site will at a minimum establish the following positions within its emergency response organization with corresponding responsibilities as outlined below. The site-specific appendix gives detailed staffing and organizational data, including additional positions deemed necessary by the site.

### 3.2.2 Site Vice President (Watts Bar Only)

- A. The Site Vice President serves as a corporate interface for the SED, relieving him from duties which could distract from the SED's primary purpose of plant operations and accident mitigation activities. The Site Vice President provides assistance to the SED by providing TVA policy direction; directing site resources to support the SED in accident mitigation activities; and providing a direct interface on overall site response activities with NRC, DHS, or other Federal organizations responding to the site, CECC Director, or onsite media.
- B. At his discretion, he may provide an interface at the appropriate offsite location on the overall site response activities with State and local agencies, NRC region/corporate, or Joint Information Center. He also provides support to other emergency operation centers as necessary.

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#### 4.1.3 (cont.)

#### Alert (continued)

- B. The purposes of the Alert class are:
1. To ensure that emergency personnel are readily available to respond if the situation becomes more serious or to perform confirmatory radiation monitoring, if required; and
  2. To provide offsite authorities current status information.
  3. To ensure that monitoring teams are dispatched (Sequoyah and Browns Ferry only).
- C. The Alert class is maintained until event termination or escalation to a higher class. The State authorities are notified and in turn notify the local authorities. Following closeout, State authorities are briefed and no later than the next working day a written summary of significant events which occurred is forwarded to the State.

#### 4.1.4 Site Area Emergency

- A. A Site Area Emergency is declared when events are in progress or have occurred which involve an actual or likely major failures of plant functions needed for protection of the public or Hostile Action that results in intentional damage or malicious acts (1) toward site personnel or equipment that could lead to the likely failure of or; (2) that prevent effective access to equipment needed for the protection of the public. Any releases are not expected to result in exposure levels which exceed EPA Protective Action Guideline exposure levels beyond the site boundary.
- B. The purposes of the Site Area Emergency class are:
1. To ensure that response centers are activated.
  2. To assure that monitoring teams are dispatched.
  3. To assure that personnel required for evacuation of nearsite areas are at duty stations if the situation becomes more serious.
  4. To provide current information for, and consultation with, offsite authorities and the public.
- C. The Site Area Emergency class is maintained until event termination or escalation to a higher class. The State authorities are notified and in turn notify the local authorities. Following closeout, State authorities are briefed and no later than the next working day a written summary of significant events which occurred is forwarded to the State.

#### 4.1.5 General Emergency

- A. A General Emergency is declared when events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity or Hostile Action that results in an actual loss of physical control of the facility. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more that the immediate site area.
- B. The purposes of the General Emergency class are:

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## 5.1 Onsite

Upon detection of a known or suspected emergency, the Shift Manager on duty will utilize the site-EPIP-1 to determine the classification of the emergency. After determining the classification of the emergency, the SED will initiate the appropriate procedures referenced by the site-EPIP-1. Each procedure referenced by site-EPIP-1 gives specific instructions on staffing the TSC and OSC and for notifying the State, ODS, and NRC.

## 5.2 Offsite

Implementing procedures are provided to activate TVA and State emergency staffs. Essential emergency positions are covered on a 24-hour-a-day basis by duty personnel. Emergency centers are located to ensure rapid and effective response of personnel needed to assess and evaluate offsite conditions.

### 5.2.1 Notification of Unusual Event (NOUE)

Upon declaration of this class, the following actions are performed:

- A. The MCR notifies and relays the information to the State within 15 minutes of declaration of the event.
- B. The ODS in Chattanooga is notified of the event by the MCR and records the details of the event in accordance with the appropriate EPIP.
- C. The ODS notifies and relays the information to the EDO and CECC Director.
- D. The EDO keeps the CECC Director and the Public Information Manager informed of the situation as necessary.
- E. The PIM notifies the Site Communications Consultant; Director, Public Relations & Corporate Information; and TVA News Bureau (Knoxville).
- F. The SED augments plant shift personnel as necessary to initiate corrective or protective actions.

### 5.2.2 Alert

Upon declaration of this class, the following minimum actions are performed:

- A. Notifications described in Section 5.2.1 are performed.
- B. The CECC is activated.
- C. Environmental sampling teams are dispatched for Sequoyah and Browns Ferry and may be dispatched at this classification level for Watts Bar.
- D. The TSC and the OSC are activated.
- E. The situation is analyzed and any appropriate corrective or preventive actions initiated.
- F. Hourly, or more often as necessary, the State agencies are updated through the CECC on appropriate plant status and environmental conditions as follows:

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### 9.2.1 (cont.)

### General Information (continued)

This procedure is designed to direct the activities of the Meteorologist during a radiological emergency to provide a timely response, consistent and accurate meteorological information, and atmospheric transport and dispersion advice.

R. CECC-EPIP-18-TRANSPORTATION AND STAFFING UNDER ABNORMAL CONDITIONS

This procedure provides instructions for the transportation of TVA employees under certain limited circumstances. It also includes instructions for lodging and meals as necessary under those circumstances.

S. CECC-EPIP-19- POST ACCIDENT FUEL DAMAGE ASSESSMENT

This procedure provides a method to assess the degree of reactor core damage from measured fission product concentrations and interpretations of other plant parametric data under accident conditions. The procedure also provides guidance in obtaining necessary information to predict radionuclide releases (source term) from TVA nuclear plants during accident conditions.

T. CECC-EPIP-20- NOT ACTIVE AT THIS TIME

U. CECC-EPIP-21- EMERGENCY DUTY OFFICER PROCEDURE FOR NOTIFICATION OF UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, AND GENERAL EMERGENCY

This procedure is designed to direct the EDO in notifying key TVA organizations and contacts in the event of a Notification of Unusual Event, Alert, Site Area Emergency, or General Emergency.

V. CECC-EPIP-22- OPERATIONS DUTY SPECIALIST TRANSPORTATION INCIDENTS INVOLVING A SHIPMENT OF RADIOACTIVE MATERIAL

This procedure directs the ODS in obtaining information concerning a transportation accident involving radioactive material.

W. CECC-EPIP-23- RADIOACTIVE MATERIAL TRANSPORTATION INCIDENTS

The objective of this procedure is to provide guidance and instructions to emergency personnel concerning transportation accidents involving radioactive materials.

### 9.2.2 Sampling Team

TVA has vans equipped to monitor the environment for radioactivity. Each site van has an air sampler, radiation measurement equipment, a generator, radio, and other assorted equipment. A detailed listing of the minimum required equipment is available in the CECC-EPIPs.

A. These vehicles are dispatched for environmental monitoring for Site Area Emergency and General Emergency classifications for Watts Bar and at the Alert or higher classification for Browns Ferry and Sequoyah.

B. They may be deployed for lower classifications, if warranted.



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**9.2.2 (cont.)**

**Sampling Team (continued)**

- C. Van(s) are stationed at each site.
- D. Each team has the capability to:
  1. Obtain environmental samples for analysis.
  2. Make direct radiation readings.
  3. Collect air samples and analyze them for gross beta-gamma radioactivity over a range of energies.
  4. Collect air samples and analyze them for radioiodine in the field, to concentrations as low as  $10^{-7}$  microcuries/cc.
- E. Within 30 minutes (60 minutes for BFN and SQN) of the applicable emergency declaration, one sampling team can be deployed from the plant for environmental assessment. Additional teams can be dispatched from other facilities. At least one additional team can be deployed within approximately one hour (90 minutes for BFN and SQN) of notification. Composition and activation of sampling teams are described in the EIPs.
- F. For the Site Area Emergency, and General Emergency classifications, teams are dispatched from the nearest location.
- G. They may be deployed for the Notification of Unusual Event or Alert, as noted in 9.2.2B, if warranted. If necessary, teams can be transported in a helicopter or fixed-wing aircraft.
- H. The TSC Rad Protection Manager or CECC Environs Assessor can request assistance from a neighboring plant for environmental monitoring, if deemed necessary.
- I. TVA has aquatic monitoring teams located at Chattanooga, Tennessee and Athens, Alabama. These teams have boats that can be deployed to obtain samples from the river for subsequent analysis for radioactivity in the laboratories.
- J. State agencies have the responsibility to coordinate and evaluate offsite assessment actions. All environmental monitoring activities will be coordinated through the RMCC. State environmental monitoring capabilities and the RMCC operations are referenced in Appendix E. TVA will be co-located in the RMCC and coordination of TVA and State monitoring teams will be conducted from that point. Environmental monitoring data will be shared between the State and TVA.
- K. Additional environmental monitoring assistance can be obtained by contacting the DOE offices at Oak Ridge, Tennessee or Aiken, South Carolina. The EPA in Montgomery, Alabama can also provide assistance. Environmental monitoring teams and mobile radioanalytical laboratories can be supplied. The State agencies usually request and coordinate these services.

**Sub-Attachment 2-B**

**Proposed TVA REP Appendix A, Browns Ferry Nuclear Plant (Retyped)**

**(11 Pages Follow)**



**Radiological  
Emergency  
Procedure**

**BROWNS FERRY NUCLEAR PLANT  
RADIOLOGICAL EMERGENCY PLAN**

**REP-Appendix A  
Rev. XXX  
Page 1 of 26**

Quality Related       Yes       No  
PORC Required       Yes       No

Effective Date \_\_\_\_\_

Level of Use: Information Use

Prepared by: \_\_\_\_\_

Reviewed by: \_\_\_\_\_  
10 CFR 50.54(q) Reviewer      Date

Reviewed by: \_\_\_\_\_  
Independent Qualified Reviewer      Date

Reviewed by: \_\_\_\_\_  
Reviewer      Date

Concurred by: \_\_\_\_\_  
BFN EP Manager      Date

Concurred by: \_\_\_\_\_  
BFN PORC Chair      Date

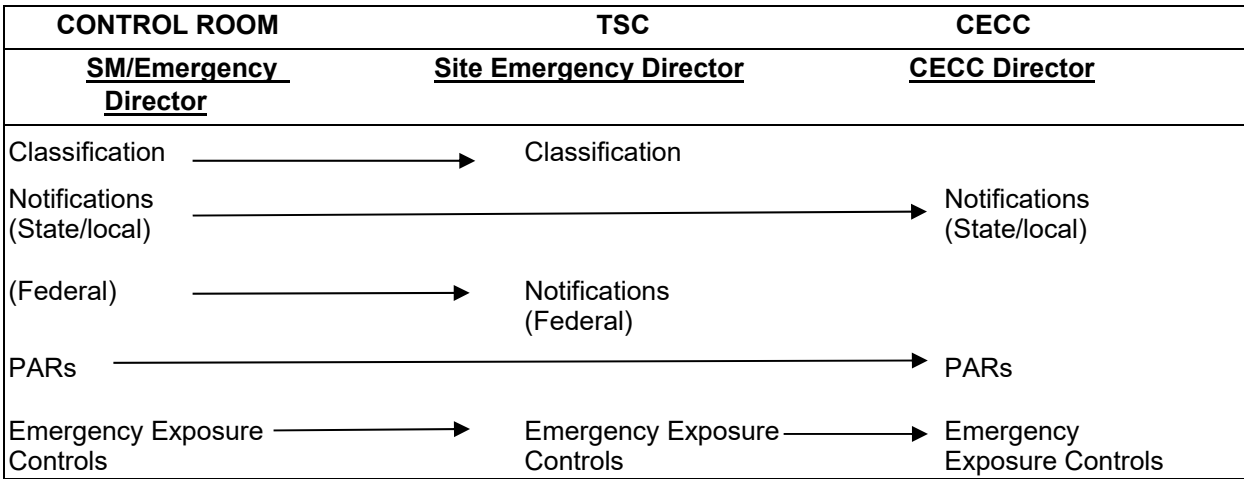
Concurred by: \_\_\_\_\_  
Director, Emergency Preparedness      Date

Approved by: \_\_\_\_\_  
VP, Nuclear Regulatory Affairs and Support Services      Date

**3.0 SITE EMERGENCY ORGANIZATION**

BFN maintains an organization capable of responding to a radiological emergency. The TSC and OSC staffing for response to emergencies is shown in Figure A-1. Figure A-1 also identifies minimum staff positions (MASP) required to activate the TSC and OSC. Facility activation will be completed within 60 minutes of an Alert or higher classification. The minimum on-shift emergency response staffing is shown in Figure A-2. The typical Command and Control transfer process is outlined in the diagram below. The TSC retains the capability to perform all command and control functions should the CECC be unavailable for any reason.

**Typical Transition of Command and Control Functions**



**3.1 Site Emergency Director**

- A. Directs onsite emergency accident mitigation activities.
- B. Consults with CECC Director on significant events and their related impacts.
- C. Initiates onsite protective actions.
- D. Coordinates accident mitigation actions with NRC.
- E. Initiates long-term 24-hour accident mitigation operations.
- F. Responsible for determining the emergency classification. This responsibility cannot be delegated.
- G. Makes final decision on personnel entrance to radiological hazardous areas when RP recommends against the entry.
- H. Approves emergency exposures when required, this cannot be delegated.

**3.2 Operations Manager**

- A. Directs operational activities.
- B. Performs damage assessment as necessary.

<b>Radiological Emergency Procedure</b>	<b>BROWNS FERRY NUCLEAR PLANT RADIOLOGICAL EMERGENCY PLAN</b>	<b>REP-Appendix A Rev. XXX Page 8 of 26</b>
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- C. Recommends solutions and mitigating action for operational problems.

### **3.3 Technical Assessment Manager**

- A. Directs onsite effluent assessment.
- B. Directs activities of technical assessment team.
- C. Projects future plant status based on present plant conditions.
- D. Keeps assessment team informed of plant status.
- E. Provides information, evaluations, and projects to Site Emergency Director.
- F. Coordinates assessment activities with the CECC plant assessment team.
- G. Ensures that Plant Status Boards are maintained.

### **3.4 Maintenance Manager**

- A. Directs repairs and corrective actions.
- B. Performs damage assessment.
- C. Directs activities of Operations Support Center.

### **3.5 Nuclear Security Manager**

- A. Directs activities of Nuclear Security Services personnel.
- B. Controls access to site and control rooms.
- C. Reports on site accountability/evacuation as defined in BFN-EIPs.

### **3.6 Radiation Protection (RP) Manager**

- A. Directs and/or performs assessment of inplant and onsite radiological conditions.
- B. Directs onsite RP activities.
- C. Coordinates additional RP support with CECC Radiological Assessment Manager.
- D. Makes recommendations for protective actions for onsite personnel.
- E. Maintains status map of offsite radiological conditions.
- F. Coordinates assessment of radiological conditions offsite with CECC Radiological Assessment Manager.
- G. Maintains inplant radiation status board.
- H. Coordinates briefing of maintenance teams with maintenance manager and assigns a RP Technician to accompany them if necessary.

<b>Radiological Emergency Procedure</b>	<b>BROWNS FERRY NUCLEAR PLANT RADIOLOGICAL EMERGENCY PLAN</b>	<b>REP-Appendix A Rev. XXX Page 10 of 26</b>
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**3.13 NRC Coordinator**

- A. Acts as primary liaison with onsite NRC personnel.
- B. Updates NRC personnel on plant status.
- C. Provides information requests from NRC to TSC personnel.

**3.14 Operations Communicator**

- A. Provides operational knowledge for status evaluation of plant systems.
- B. Provides advice regarding technical specifications, system response, safety limits, etc.
- C. Assists in development of recommended solutions to developing problems.
- D. Provides support performance of Federal Notification function.

**3.15 TAT Mechanical**

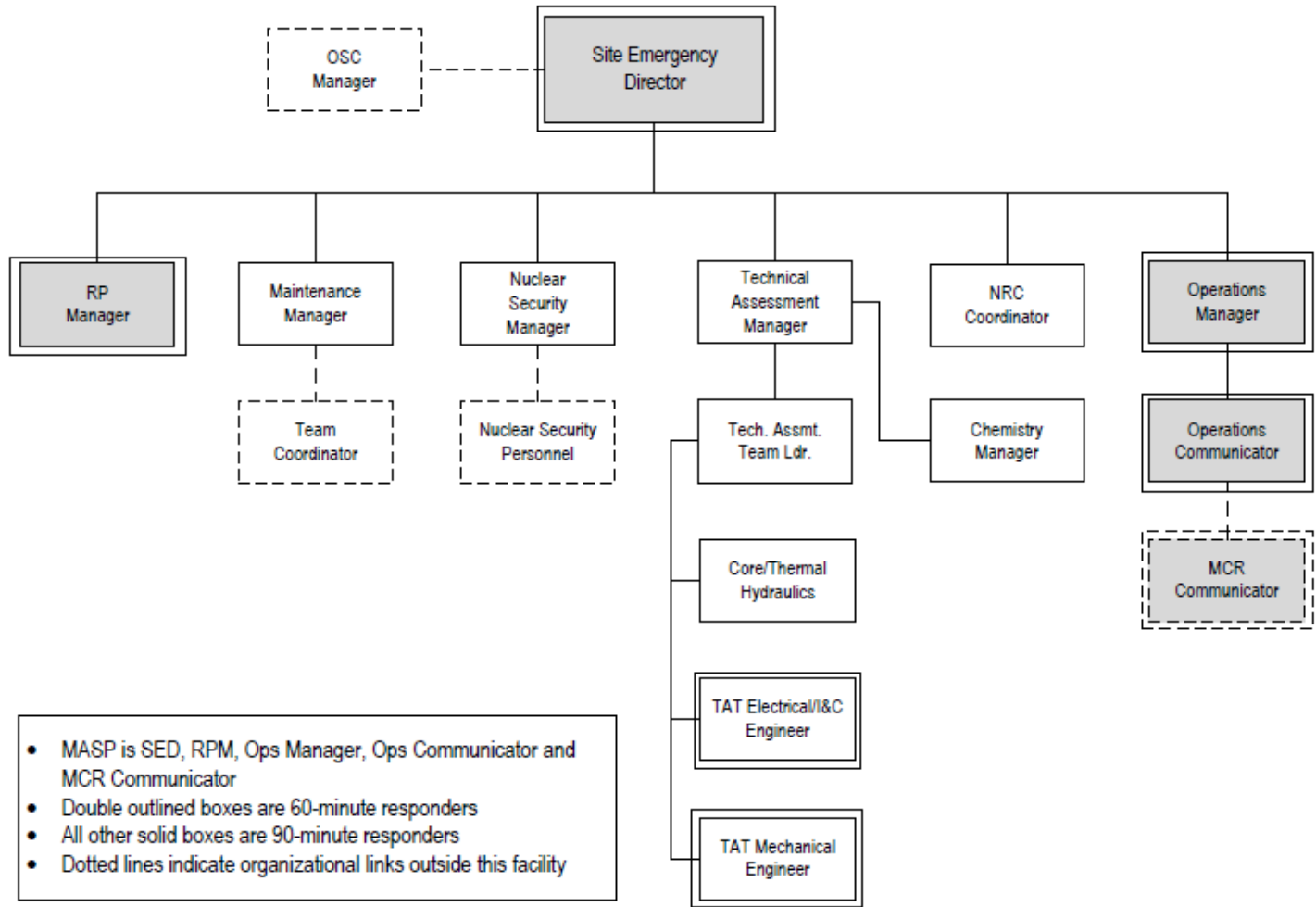
- A. Serves as the primary interface with Engineering.
- B. Provides for additional engineering support during and/or following a radiological emergency.
- C. Coordinates the design and construction of emergency equipment and structures as necessary.

**3.16 Technical Assessment Team**

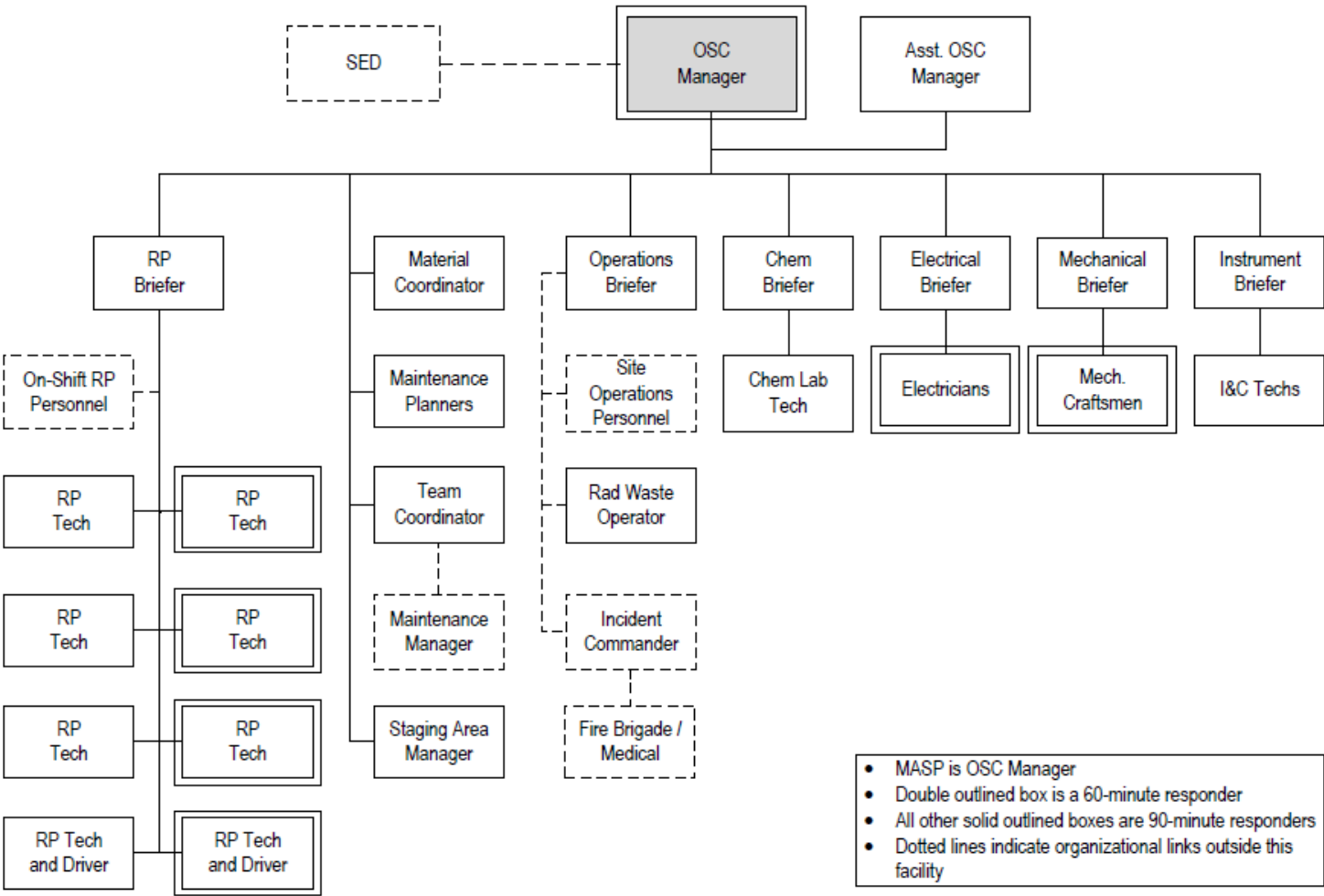
- A. Prepares and provides periodic current assessments on plant conditions and provides this information to the CECC plant assessment team.
- B. Projects future plant status based on present plant conditions.
- C. Provides technical support to plant Operations on mitigating actions.

3.17 Emergency Response Organization Staffing

**Figure A-1  
TSC EMERGENCY ORGANIZATION  
(including minimum staffing and augmentation)**



**Figure A-1 (continued)  
OSC EMERGENCY ORGANIZATION  
(including minimum staffing and augmentation)**





**Figure A-2  
MINIMUM EMERGENCY RESPONSE STAFFING**

Major Functional Area	Major Tasks	Position Title or Expertise	On-Shift	Augmented Response		
				60 min	90 min	
Plant Operations and Shift Supervisor (SRO): Assessment of Control Room Reactor Operational Aspects		Shift Manager/ED (SRO)	1	---	---	
		Unit Supervisors (SRO)	3	---	---	
		Unit Operators (UO)	6	---	---	
		Auxiliary Unit Operators (AUO)	9	---	---	
Notification/ Communication	Notify State, local and Federal personnel & maintain communication	Emergency Communicator (Shift)	1**	---	---	
		MCR Communicator (CR)	---	1	---	
		Ops Manager (TSC)	---	1	---	
		Ops Communicator (TSC)	---	1	---	
		State Communicator (CECC)	---	1	---	
		EDO (CECC)	---	1	---	
Radiological Accident Assessment and Support of Operational Accident Assessment	Emergency Operations Facility Director	SED (TSC)	---	1	---	
		CECC Director	---	1	---	
		Plant Assmt Manager (CECC)	---	1	---	
	Offsite Dose Assessment	Chemistry Technician	RP Manager (TSC)	1**	---	---
			RAM/RAC (CECC)	---	1	---
			Dose Assessor (CECC)	---	1	---
			RP Tech / Support	---	2	2
	Onsite Surveys (out-of-plant) and In-Plant Surveys	RP Tech	2	1	1	
	Chemistry/ Radio Chemistry	Chemistry Technician	1	---	1	
	Plant System Engineering	Technical Support	Shift Technical Advisor (SRO)	1	---	---
Tech Assmt Manager (TSC)			---	---	1	
Tech Assmt Team Lead (TSC)			---	---	1	
Core Damage Assessor (CECC)			---	1	---	

Major Functional Area	Major Tasks	Position Title or Expertise	On-Shift	Augmented Response	
				60 min	90 min
Plant System Engineering (continued)	Technical Support	Core/Thermal Hydraulics (TSC)	---	---	1
		Electrical Engineer (TSC)	---	1	---
		Mechanical Engineer (TSC)	---	1	---
Repair and Corrective Actions	Repairs and Corrective Actions	Mechanical Maintenance	---	1	---
		Electrical Maintenance	---	1	---
		Instrument Control	---	---	1
		OSC Manager	---	1	---
Protective Actions (In-Plant)	Radiation Protection: a. Access Control b. HP Coverage for repair, corrective actions, search and rescue, first-aid & firefighting c. Personnel monitoring d. Dosimetry	RP Tech	1	2	2
Fire Fighting		Fire Brigade (FPDP-1)	5	Local Support	Local Support
Rescue Operations and First Aid		Incident Commander (SRO)	1	Local Support	Local Support
		Other Site personnel	2**		
Site Access Control And Personnel Accountability	Security, firefighting communications personnel accountability	Security Personnel	Per Security Plan		
<b>TOTAL</b>			<b>30</b>	<b>22</b>	<b>10</b>

\*\* May be provided by shift personnel assigned other functions

<b>Radiological Emergency Procedure</b>	<b>BROWNS FERRY NUCLEAR PLANT RADIOLOGICAL EMERGENCY PLAN</b>	<b>REP-Appendix A Rev. XXX Page 15 of 26</b>
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#### **4.0 EMERGENCY RESPONSE FACILITIES, EQUIPMENT, AND SUPPLIES**

Specific plant areas, facilities, and equipment are selected and provided for use during a radiological emergency. The preselection, allocation, and inclusion of emergency facilities assure that needed services and equipment are available for use during emergency conditions.

#### **4.1 Technical Support Center (TSC)**

A specific area (between units 1 and 2 control room and unit 3 control room) in the control bay at elevation 617.0' is designated for use as the TSC. The room is provided with communication facilities for plant areas and areas external to the plant. The communication facilities include TVA telephone system (with Bell System access, TVA Microwave System access, and long distance access), a paging-intercom system, and two-way radio capabilities. This room is sufficiently shielded to ensure occupancy during an emergency and is designed to be continuously habitable during all radiological emergencies. All ventilating and air-conditioning facilities have redundant or backup systems. Toilet facilities are available on the same elevation.

The diesel generators will provide emergency power when there is a loss of normal ac power, and cooling water for the air-conditioning equipment can be taken from the emergency equipment cooling water system. Emergency equipment is specially designated and stored near the TSC for use during an emergency. Figure A-3 shows a detailed TSC layout.

Meteorological information is available both in the TSC and main control room and includes wind speed and direction at 10, 46, and 91 meters, and temperature at 10, 46, and 91 meters.

TSC emergency response positions are described in BFN EPIP-6, "Activation and Operation of the Technical Support Center". Figure A-1 identifies minimum staff positions required to activate the TSC. Facility activation will be completed within 60 minutes of an Alert or higher classification.

#### **4.2 Operations Support Center (OSC)**

The role of the OSC is to provide an assembly area for operations support personnel during an emergency situation and is under the supervision of the OSC Manager. The Plant Operations Support Center at elevation 586' in the service building (see Figure A-4) is designated for use as the OSC. The OSC is provided with telephone communications. In the event that radiation conditions require evacuation of this area, OSC personnel will report to the office building, elevation 586'.

OSC emergency response positions are described in BFN EPIP-7, "Activation and Operation of the Operations Support Center." Figure A-1 identifies minimum staff positions required to activate the OSC. Facility activation will be completed within 60 minutes of an Alert or higher classification.

4.5 Facility Figures

FIGURE A-3  
TECHNICAL SUPPORT CENTER (SAMPLE)

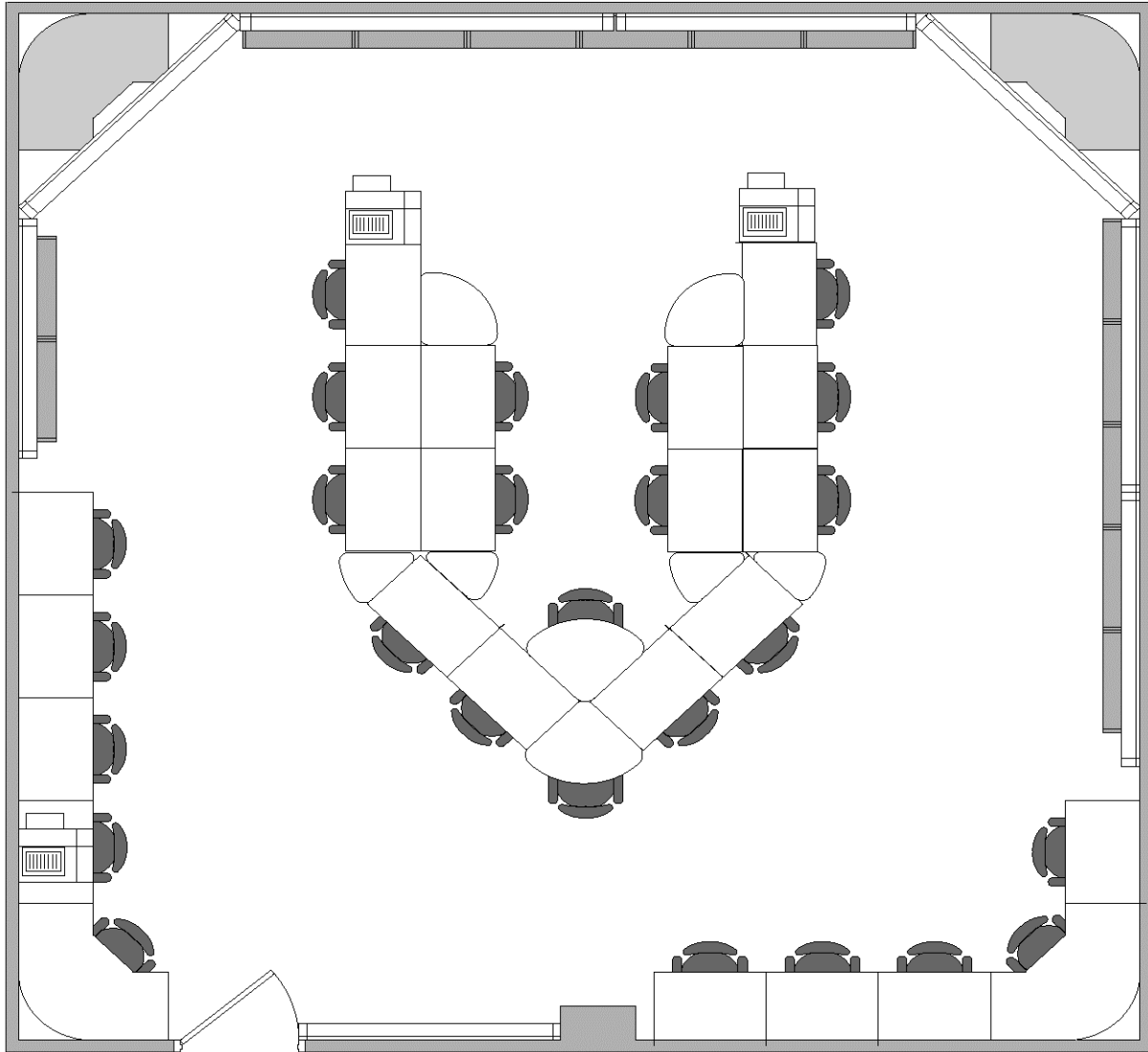
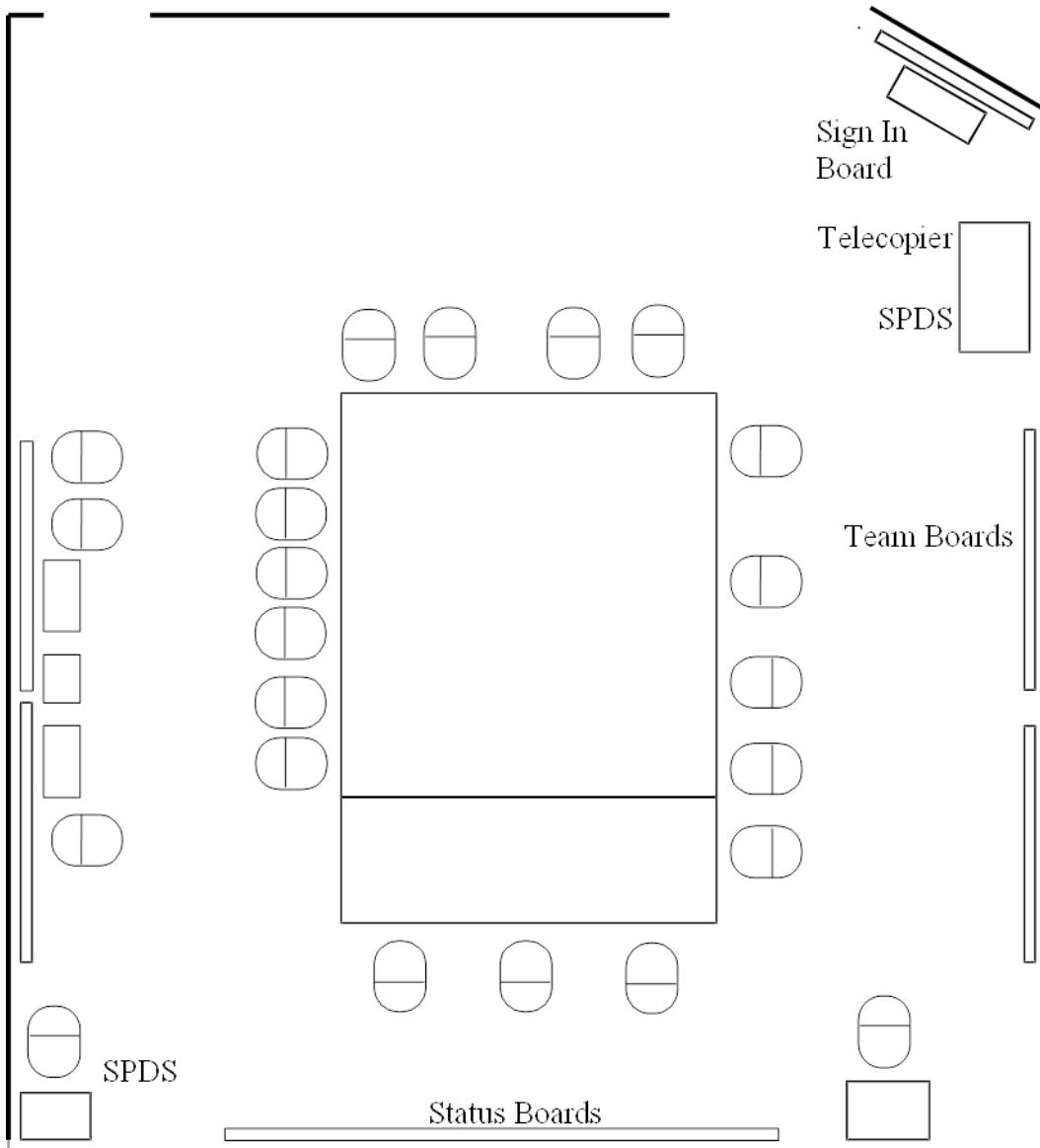


FIGURE A-4  
OPERATIONS SUPPORT CENTER (SAMPLE)



## 4.6 Onsite Monitoring Systems and Equipment

### 4.6.1 Natural Phenomena

In the event an emergency is the result of a natural phenomena, there is instrumentation to monitor its severity. The Environmental Data Station is located onsite and contains instruments capable of measuring wind direction, wind speed, and temperatures. Seismic instrumentation is available in the plant to monitor acceleration levels of ground movement. Hydrological monitoring systems are installed to supply flow and level information for each site. Meteorological and seismic instrumentation have readily accessible readout in the main control room. More specific information on these systems can be found in the Browns Ferry FSAR.

**Attachment 3**

**NUREG-0654 Table B-1 Comparative Chart**

**(3 Pages Follow)**

### BFN Site On-Shift Table Comparison

Major Functional Area	Major Tasks	Position Title / Expertise	Table B-1 on-shift	BFN Rev 0 1988	BFN Rev 110 Current	BFN Proposed On-shift
Plant Operation and Assessment of Operation Aspects		Shift Supervisor (SRO)	1	1	1	1
		Shift Foreman (SRO)	1	3	3	3
		Control Room Operators	2	4	6	6
		Auxiliary Operators	2	3	9	9
Emergency Direction and Control (Emergency Coordinator) ***		STA. Shift Supervisor or facility manager	1**	1**	1**	1**
Notification / Communication ****	Notify State/local and federal personnel, maintain communication		1****	1*****	1****	1****
Radiological Accident Assessment and Support of Operational Accident Assessment	In-Plant surveys	HP Technicians	1	1	1	2
	Chemistry / Radiochemistry	Chem Technicians	1	2	1	1
Plant System Engineering	Technical support	Shift Technical Advisor	1	1	1	1
Repair and Corrective Actions	Repair and Corrective Actions	Mechanical Maintenance	1**	2	1	
		Electrical Maintenance	1**	2	1	
		Inst Maintenance		1		
Protective Actions (In-Plant)	Radiation Protection: a. Access Control b. HP Coverage for repair, corrective actions, search and rescue first-aid & firefighting c. Personnel monitoring d. Dosimetry	HP Technicians	2**	1	1	1
Firefighting		Fire Brigade Report (FPDP-1)				5
Rescue Operations and First-Aid		Incident Commander	2**	2**	1	1
Site Access Control and Personnel Accountability	Security, firefighting communications, personnel accountability	Security personnel per security plan				
<b>Total On-Shift</b>			<b>10</b>	<b>21</b>	<b>26</b>	<b>30</b>

\*\*May be provided by shift personnel assigned other functions

\*\*\*Overall direction of facility response to be assumed by EOF director when all centers fully manned

\*\*\*\*May be performed by engineering aide to shift supervisor

**BFN Site 30 Minute Augmented ERO Table Comparison**

<b>Major Functional Area</b>	<b>Major Tasks</b>	<b>Position Title / Expertise</b>	<b>Table B-1 Augment</b>	<b>BFN Rev 0 30 min</b>	<b>BFN Rev 110 30 min</b>	<b>BFN Proposed 60 min</b>
Notification / Communication	Notify State/local and federal personnel, maintain communication		1			5
Radiological Accident Assessment and Support of Operational Accident Assessment	Emergency Response & Recovery Director	Senior Manager				3
	Offsite Dose Assessment	Sr. HP Expertise	1			3
	Offsite Surveys	HP Technician/driver	2		2	2
	On-Site Surveys	HP Technician	1		1	1
	In-Plant surveys	HP Technician	1		1	
	Chemistry / Radiochemistry	Chem/HP Technician				
Plant System Engineering	Technical Support	TAM				
		TATL				
		Core/Thermal Hydraulics	1	1		1
		Electrical				1
		Mechanical				1
Repair and Corrective Actions	Repair and Corrective Actions	Mechanical Maintenance				1
		Electrical Maintenance	1		1	1
		I&C Technician	1		1	
		OSC Manager				1
Protective Actions (In-Plant)	Radiation Protection: a. Access Control b. HP Coverage for repair, corrective actions, search and rescue first-aid & firefighting c. Personnel monitoring d. Dosimetry	HP Technicians	2		2	2
<b>Total Augmented ERO</b>			<b>11</b>	<b>1</b>	<b>8</b>	<b>22</b>



**BFN Site 60 Minute Augmented ERO Table Comparison**

<b>Major Functional Area</b>	<b>Major Tasks</b>	<b>Position Title / Expertise</b>	<b>Table B-1 Augment</b>	<b>BFN Rev 0 60 min</b>	<b>BFN Rev 110 60 min</b>	<b>BFN Proposed 90 min</b>
Notification / Communication	Notify State/local and federal personnel, maintain communication		2	3	3	
Radiological Accident Assessment and Support of Operational Accident Assessment	Emergency Response & Recovery Director	Senior Manager	1	3	3	
	Offsite Dose Assessment	Sr. HP Expertise		2	2	
	Offsite Surveys	HP Technician/driver	2		2	2
	On-Site Surveys	HP Technician	1		1	1
	In-Plant surveys	HP Technician	1		1	
Plant System Engineering	Technical Support	Chemistry / Radiochemistry	1		1	1
		TAM				1
		TATL				1
		Core/Thermal Hydraulics			1	1
		Electrical	1	1	1	
Repair and Corrective Actions	Repair and Corrective Actions	Mechanical	1		1	
		Electrical Maintenance	1		1	
		I&C Technician				1
		RWO			1	1
Protective Actions (In-Plant)	Radiation Protection: a. Access Control b. HP Coverage for repair, corrective actions, search and rescue first-aid & firefighting c. Personnel monitoring d. Dosimetry	HP Technicians	2		2	2
<b>Total Augmented ERO</b>			<b>15</b>	<b>10</b>	<b>21</b>	<b>10</b>

**Attachment 4**

**Off-site Response Organizations Concurrence Letters**



KAY IVEY  
GOVERNOR

STATE OF ALABAMA  
**EMERGENCY MANAGEMENT AGENCY**

5898 COUNTY ROAD 41 • P.O. DRAWER 2160 • CLANTON, ALABAMA 35046-2160  
(205) 280-2200 FAX # (205) 280-2495



BRIAN E. HASTINGS  
DIRECTOR

Date: August 5, 2019

To: Walter H. Lee, Director  
Emergency Response  
Tennessee Valley Authority (TVA)

From: LaTonya Stephens, Director  
Administration and Preparedness  
Alabama Emergency Management Agency

Subject: Support of staffing changes for the Browns Ferry Nuclear Plant Emergency Response  
Organization documented in the TVA Radiological Response Plan

This memorandum provides written concurrence with the changes TVA is proposing to the Browns Ferry Nuclear Plant (BFN) Emergency Response Organization (ERO) as documented in the TVA Radiological Emergency Plan (REP). Based on the information provided by Josh Perrel of your staff, we understand that the changes eliminate certain positions and extend the response times of other positions. We recognize that the proposed change also extends the time requirements for dispatching sampling teams by 30 minutes. Based on our discussions, we have concluded that through continued coordination between the State of Alabama's Emergency Management Agency and TVA radiological assessment organizations, adequate field monitoring will be maintained.

It is believed the changes for staffing will not have an adverse effect for radiological response found in the REP Annex of the State of Alabama's Emergency Operations Plan. We have identified no changes at this time to our annex.



# ALABAMA DEPARTMENT OF PUBLIC HEALTH

Scott Harris, M.D., M.P.H.  
State Health Officer



## MEMORANDUM

DATE: August 5, 2019

TO: Walter H. Lee, Director  
Emergency Response  
Tennessee Valley Authority (TVA)

FROM: Kevin W. Hicks, M.P.A., Director *Kevin W. Hicks*  
Emergency Planning & Environmental Monitoring  
Office of Radiation Control

SUBJECT: Support of Staffing changes for the Browns Ferry Nuclear Plant Emergency Response Organization documented in the TVA Radiological Response Plan

This memorandum provides written concurrence with the changes TVA is proposing to the Browns Ferry Nuclear Plant (BFN) Emergency Response Organization (ERO) as documented in the TVA Radiological Emergency Plan (REP). Based on the information provided by Josh Perrel of your staff, we understand that the changes eliminate certain positions and extend the response times of other positions. We recognize that the proposed change also extends the time requirements for dispatching sampling teams by 30 minutes. Based on our discussions, we have concluded that through continued coordination between the Alabama Department of Public Health, Office of Radiation Control and TVA radiological assessment organizations, adequate field monitoring will be maintained.

It is believed the changes for staffing will not have an adverse affect on radiological response for Browns Ferry Nuclear Plant. We have reviewed our portion of the REP Annex found in the State of Alabama Emergency Operations Plan and find that no changes are required at this time.